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BLUE BOOK

1941

for manufacturers and distributors of

SOAPS
INSECTICIDES
DISINFECTANTS
CHEMICAL SPECIALTIES
SANITARY SUPPLIES
POLISHES
CLEANERS

Issued Annually by the Publishers of

SOAP AND SANITARY CHEMICALS

NEW YORK

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by
MacNAIR-DORLAND CO.

DU PONT
REG. U.S. PAT. OFF.

AROMATICS

for the soap manufacturer

ACETOPHENONE
ALCOHOL C-8
ALCOHOL C-10
ALCOHOL C-12
ALPINE VIOLET (Cyclamen Aldehyde)
AMYL SALICYLATE
ANISIC ACID
ANISIC ALCOHOL
ANISYL ACETATE
ANTIOXIDANT No. 101
AUBEPINE LIQUID (Anisic Aldehyde)
BENZOPHENONE
BENZYL ACETATE
BENZYL ALCOHOL PURE
BERGAMOT ARTIFICIAL
CAMPHENE
CEDROL
CINNAMIC ALCOHOL
CITRAL
CITRONELLOL EXTRA
COUMARIN
DIMETHYL ANTHRANILATE
DIMETHYL HYDROQUINONE
GERANIOL
GERANIUM ARTIFICIAL
GERANYL ACETATE EXTRA
GERANYL ACETATE TECHNICAL
HEXYL BENZYL ETHER
HYACYLENE P and S (Dimethyl Acetal of Phenyl Acetaldehyde)
HYDROXYCITRONELLAL
INDOLE
ISO AMYL BENZYL ETHER
ISOBORNEOL
ISOBORNYL ACETATE
ISOPULEGOL ACETATE
ISOPULEGOL
LAVENDER SYNTHETIC
LINALYL ACETATE
METHYL ACETOPHENONE
METHYL ANTHRANILATE
METHYL RHODIONE EXTRA
METHYL RHODIONE FOR SOAP
MUGOL (Dimethyl Acetal of Hydroxycitronellal)
MUSK AMBRETTE
MUSK KETONE
MUSK XYLOL
OCTYL ACETATE
OCTYL FORMATE
PARACRESOL METHYL ETHER
RHODIONE AB
RHODIONE FOR SOAP
SKATOLE
TERPINEOL
TERPINYL ACETATE EXTRA
TERPINYL ACETATE TECHNICAL
VIOLET KETONE

ALSO the famous SCUR products manufactured by Societe des Usines Chemiques, Rhone-Poulenc, Paris, France.

● To insure quality in a finished product, it is essential to use the finest ingredients obtainable and to maintain effective control throughout its production. When you use du Pont Aromatics, you are assured of the uniformity and high quality which permit proper control in the manufacture of fine soaps.

E. I. DU PONT DE NEMOURS & CO., (INC.)

FINE CHEMICALS DIVISION
WILMINGTON, DELAWARE

40 WORTH STREET
NEW YORK CITY

7 SOUTH DEARBORN STREET
CHICAGO, ILL.

BLUE BOOK

1941

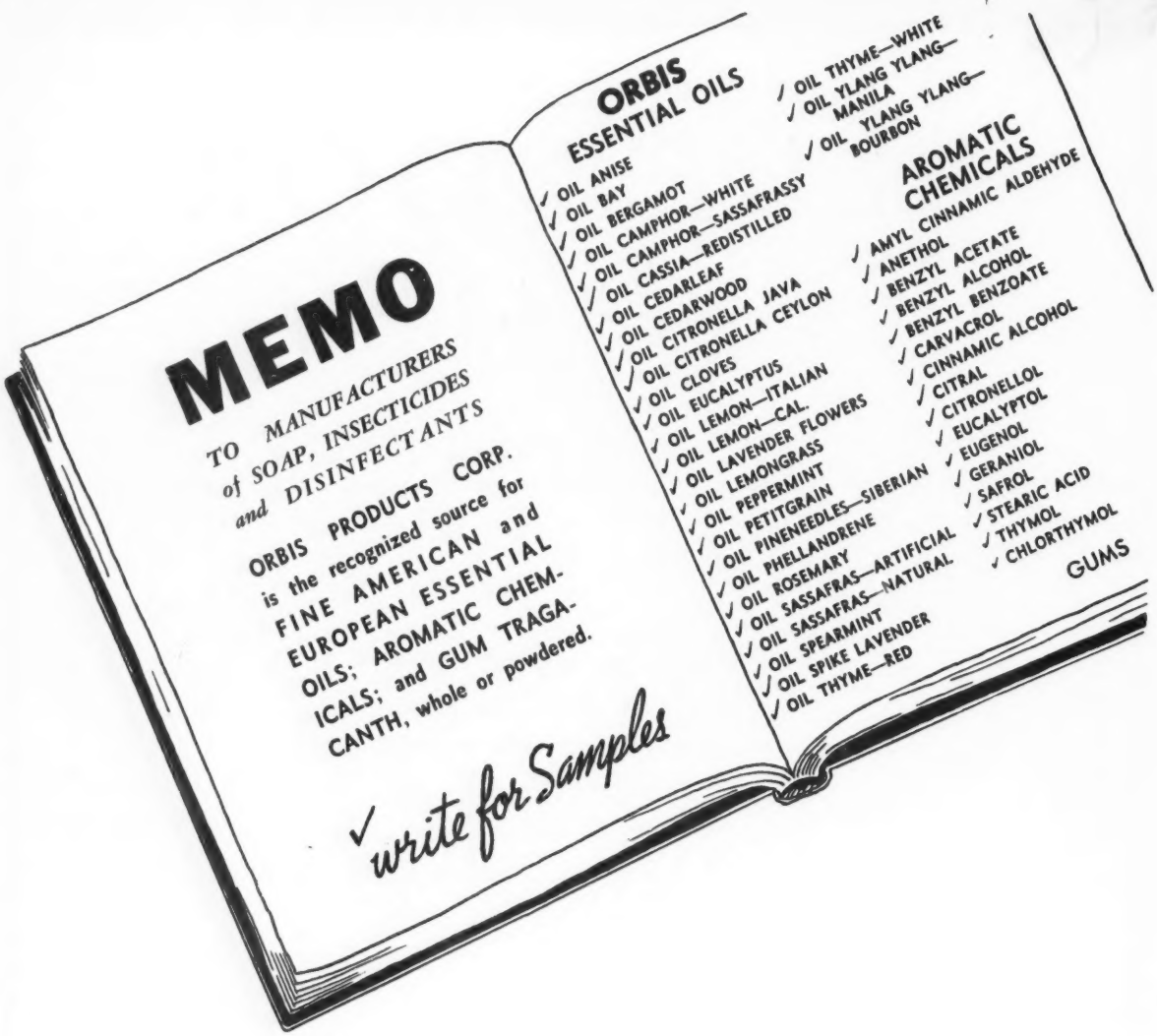
AN ANNUAL BUYERS GUIDE,
DIRECTORY AND REFERENCE
VOLUME FOR MANUFACTURERS
AND DISTRIBUTORS OF SOAPS,
INSECTICIDES, DISINFECTANTS,
POLISHES, CLEANERS AND
ALLIED CHEMICAL SPECIALTIES

Thirteenth Edition

ISSUED ANNUALLY BY

MacNair-Dorland Company

254 West 31st Street New York, N. Y.



ORBIS

PRODUCTS CORPORATION

215 PEARL STREET, NEW YORK - FACTORY & LABORATORY, NEWARK, N.J.

CHICAGO
831 N. Wabash Ave.

PHILADELPHIA
610 Brown Bldg.

BOSTON
89 Broad Street

CINCINNATI
505 W. McMillan St.

MEMPHIS, TENN.
1620 Carr Ave.

Water Soluble Gums	Waxes	Cosmetic Raw Material	Fruit Flavors
Filter Paper	Stearic Acid	Oleo Resins	Food Colors
Aromatics	Essential Oils	Perfume Bases	Quince Seed
Rice Starch	Zinc Oxide French	Olive Oil	Irish Moss

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1941 c.1
APR 26 1941

Foreword

THE BLUE BOOK is intended as a condensed buying guide for manufacturers and bulk buyers of soaps, insecticides, disinfectants, polishes, cleaners and allied sanitary supplies. It seeks to tell these concerns not only what to buy and where to buy, but how to buy as well.

If you are not listed in this edition of the BLUE BOOK we regret this as much as you do. Questionnaires were mailed to all companies closely identified with the soap and sanitary chemical industries in October. Some of these were not returned. In a book as comprehensive as the BLUE BOOK it is not possible for the editors to spot every missing name even though the final galley proofs are checked three times and many changes and additions are made. **No one was purposely overlooked.** Send for a questionnaire now if your listings are missing or incomplete—but please do not enter a strenuous complaint as we have made every effort to have this BLUE BOOK as complete and accurate as it can be made.

Listings are **never** withheld because a firm is not an advertiser in SOAP & SANITARY CHEMICALS or the BLUE BOOK. A glance through this edition will reveal hundreds of light faced listings—all of non-advertisers. BLUE BOOK advertisers are listed in black face type.

Manufacturers of soaps and sanitary chemicals who are not listed should consider this point—the BLUE BOOK is not intended as a complete list of manufacturers of finished products. It has no consumer circulation and for this reason soap and sanitary chemical listings are confined to firms selling sanitary supply houses and repackers either in bulk or under private brand.

THE PUBLISHERS.

March 15, 1941.

The Finest Milled Pyrethrum and Derris Powders in the World

McCORMICK PYRETHRUM POWDER: Has a known high pyrethrin content. Milled to microscopic fineness—contains more killing particles per ounce—remains suspended in the air longer. More effective and economical because it comes into more intimate contact with the vital parts of the insect's body.

McCORMICK DERRIS POWDER: Also milled to extreme fineness. Standardized at 4% and 5% rotenone. Suitable for use in derris dusts when combined with a carrier, or in aqueous suspension sprays. Will not clog spray nozzles.

Other Derris Derivatives

DERRIS EXTRACT: Contains 5 grams of rotenone per 100 cc. plus the other toxic derivatives of derris root.

DERRIS EXTRACT (Dry): Consists of 25% rotenone and 75% of active resins.

ROTENONE CRYSTALS: Solvate, a white crystalline product, 71% rotenone.

New—Bee Brand Disinfectant

An amazing new Disinfectant and Deodorant with a phenol coefficient of 8 (F.D.A. Method). Possesses high germicidal, deodorizing and fungicidal efficiency. Practically odorless when diluted; can be used where products with carbolic or phenol odors would be unsuitable or objectionable. Does not irritate the skin even if spilled on hands in concentrated form.

For further information about these products address:

The McCormick Sales Co.

BALTIMORE, MARYLAND

IN CANADA: McCORMICK & CO. (CANADA) Ltd.
454 KING STREET, WEST, TORONTO, ONTARIO

Buyers' Guide Section

LISTING SOURCES OF SUPPLY FOR RAW MATERIALS, MACHINERY AND EQUIPMENT BOUGHT BY MANUFACTURERS OF SOAPS AND SANITARY CHEMICALS.

●

Included in this section are the names of manufacturers of soaps and sanitary chemicals who sell private brand and bulk products to jobbers and distributors. It is not intended to list concerns who sell direct to consumers.

KAY FRIES
CHEMICALS INC.

Office:
180 Madison Avenue
New York, N. Y.

Works:
West Haverstraw, N. Y.

ORGANIC AND AROMATIC CHEMICALS

for Soaps, Perfumes, Pharmaceuticals, Cosmetics, Denaturing, Insecticides, Fumigation and other purposes

Phenyl Ethyl Alcohol
Phenyl Ethyl Acetate
Phenyl Ethyl Salicylate

Benzyl Acetate
Benzyl Alcohol
Benzyl Benzoate
Ethyl Benzoate

Diethyl Phthalate
Dimethyl Phthalate
Dibutyl Phthalate

Yara Yara
(Beta-Naphthol Methyl Ether)

Benzophenone
Acetophenone
Methyl Acetophenone

Phenyl Acetic Acid
Methyl Phenyl Acetate
Ethyl Phenyl Acetate
Amyl Phenyl Acetate

Alpha Amyl Cinnamic Aldehyde
Methyl Formate
Ethyl Formate

Nerolin
(Beta-Naphthol Ethyl Ether)

PENETROL

A NEUTRAL BASE FOR PYRETHRUM AND ROTENONE PLANT SPRAYS, MIXES EASILY WITH HARD COLD WATER. FORMULAE AND DATA AVAILABLE.

CRESYLIC ACID
HIGH-BOILING TAR ACIDS
AMMONIUM CARBONATE
SODIUM BICARBONATE

U. S. P. FORMALDEHYDE

Sole Selling Agents

American-British Chemical Supplies, Inc.

180 MADISON AVENUE, NEW YORK CITY
Telephone—AShland 4-2265
Cable Address—Bisulphide, New York City

Associated Companies:
CHARLES TENNANT & COMPANY (CANADA) LTD.
372 Bay Street, Toronto 2, Canada
CHARLES TENNANT & CO., LTD.
Glasgow, Scotland
BARTER TRADING CORP., LTD.
London, England

ABRASIVES AND FILLERS (Pumice, Silica, Feldspar, Clays, etc.)

American Colloid Co., 363 W. Superior St., Chicago
Aluminum Co. of America, Gulf Bldg., Pittsburgh, Pa.
Barnsdall Tripoli Corp., Pumice Div., Seneca, Mo.
California Industrial Minerals Co., Friant, Calif.
Chas. B. Chrystal Co., 11 Park Pl., N. Y.
Dicalite Co., 120 Wall St., N. Y.
A. C. Drury & Co., 219 E. North Water St., Chicago
K. F. Griffiths Co., 110 E. 42nd St., N. Y.
Goris & Arnstein, 3700 Racine Ave., Chicago
Hammill & Gillespie, 225 Broadway, N. Y.
Johns-Manville, 22 E. 40th St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Mid-Co., Products Co., 2 Railway Exch. Bldg., Kansas City, Mo.
Nature Minerals Co., 108 W. 6th St., Los Angeles.
Jas. H. Rhodes & Co., 157 W. Hubbard St., Chicago
L. A. Salomon & Bro., 216 Pearl St., N. Y.
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Tamms Silica Co., 229 N. La Salle St., Chicago
Charles A. Wagner Co., 809 Callowhill St., Phila.
Whittaker Clark & Daniels, 260 W. B'way, N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

ACETONE
(see also Dealers)

Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
Cliffs-Dow Chemical Co., Marquette, Mich.
Commercial Solvents Corp., 230 Park Ave., N. Y.
E. I. Du Pont de Nemours, Wilmington, Del.
Wm. S. Gray & Co., 342 Madison Ave., N. Y.
R. W. Greeff & Co., 10 Rockefeller Plaza, N. Y.
Merck & Co., Rahway, N. J.
Publicker Commercial Alcohol Co., 260 E. Broad St., Phila.
U. S. Industrial Chem. Co., 60 E. 42nd St., N. Y.

ACIDS (Sulfuric, Muriatic, Nitric, Acetic, Etc.)
(see also Dealers)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Hercules Powder Co., Wilmington, Del.
Hooker Electrochemical Co., Quality St., Niagara Falls, N. Y. (Muriatic)
Innis, Speiden & Co., 117 Liberty St., N. Y.
Monsanto Chemical Works, 1724 S. 2nd St., St. Louis
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Rohm & Haas Co., Inc., 222 W. Washington Sq., Phila.
Jos. Turner & Co., Ridgefield, N. J.
Victor Chemical Wks., 141 W. Jackson Blvd., Chicago

ADHESIVES

Arabol Mfg. Co., 110 E. 42nd St., N. Y.
Armour Glue Wks., 1355 W. 31st St., Chicago
C. W. Campbell Co., 157 Chambers St.. N. Y.
Casein Co. of America, Bainbridge, N. Y.
Dennison Mfg. Co., Framingham, Mass.
Diamond Alkali Co., Standard Silicate Div., 535 Smithfield St., Pittsburgh
E. I. Du Pont de Nemours & Co., Wilmington, Del.
W. H. Gage Glue Co., 19 S. Main St., St. Louis
General Chemical Co., 40 Rector St., N. Y.
Hercules Powder Co., Wilmington, Del.
Mechling Bros. Chemical Co., Camden, N. J.
National Adhesives Corp.. 822 Greenwich St , N. Y.
National Starch Prods., 830 Greenwich St., N. Y.
Philadelphia Quartz Co., 125 S. 3rd St., Philadelphia
Rohm & Haas Co., 222 W. Washington Sq., Phila.
Sanford Mfg. Co., W. Congress & Peoria St., Chicago
A. E. Staley Mfg. Co., Decatur, Ill.
Stein, Hall & Co., 285 Madison Ave., N. Y.

ADVERTISING NOVELTY SOAP (see NOVELTY SOAPS)

AGITATORS

Alsop Engineering Corp., Milldale, Conn.
Beach-Russ Co., 50 Church St., N. Y.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
Eastern Engineering Co., 45 Fox St., New Haven, Conn.
Ertel Engineering Corp., Kingston, N. Y.
Foster Pump Works, 50 Washington St., Brooklyn
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259 46th St., Brooklyn
J. M. Lehmann Co., 248 Broadway, N. Y.
Littleford Bros., 443 E. Pearl St., Cincinnati
Mixing Equipment Co., Inc., 1067 Garson Ave., Rochester, N. Y.
Patterson Foundry & Machy. Co., East Liverpool, Ohio
Pfaudler Co., 89 East Ave., Rochester, N. Y.
Read Machy. Co., York, Pa.
Scientific Filter Co., I Franklin Sq., N. Y.
Ernest Scott & Co., P. O. Box 82, Fall River, Mass.
Sowers Mfg. Co., 1296 Niagara St., Buffalo
Sprout Waldron & Co., Muncy, Pa.
Struthers-Wells Titusville Corp., Warren, Pa.

AGRICULTURAL INSECTICIDES

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Calif.
Ansbacher-Siegle Corp., Rosebank, S. I.
Bowker Chemical Co., 50 Church St., N. Y.
California Spray Chemical Corp., 15 Shattuck Sq., Berkeley, Calif.
Cenol Co., 4250 N. Crawford Ave., Chicago
Chipman Chemical Co., Bound Brook, N. J.
Crystal Soap & Chemical Co., 6300 State Road, Phila.
Dodge & Olcott Co., 180 Varick St., N. Y.
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Fuld Bros., Baltimore
General Chem. Co., 40 Rector St., N. Y.
Hooker Electrochemical Co., Quality St., Niagara Falls, N. Y.
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Jungmann & Co., 157 Chambers St., N. Y.
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
McLaughlin, Gormley King Co., 1715—5th St., S. E. Minneapolis
Mechling Bros. Chemical Co., Camden, N. J.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Richards Chem. Wks., Warren & Morris Sts., Jersey City, N. J.
Rohm & Haas Co., 222 W. Washington Sq., Phila.
Schaeffer Bros. & Powell Mfg. Co., 102 Barton St., St. Louis, Mo.
Sherwin-Williams Co., 292 Madison Ave., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Standard Oil Co. (Ind.), 910 S. Michigan Ave., Chicago
Standard Oil Co., (Calif.), 225 Bush St., San Francisco
Thompson-Hayward Chem. Co., 2915 Southwest Blvd., Kansas City, Mo.
Tobacco By-Products & Chem. Corp., Louisville, Ky.
Walco Products, Inc., 512 Greenwich St., N. Y.
Water-Type Spray Co., 1128 E. 62nd St., Chicago
White Tar Co. of N. J., Belleville Turnpike, Kearney, N.J.
Whitmire Research Corp., 339 S. Vandeventer, St. Louis

AGRICULTURAL INSECTICIDE SPREADERS

American Colloid Co., 363 W. Superior St., Chicago
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Ansbacher-Siegle Corp., Rosebank, S. I.
Atlantic Refining Co., 260 South Broad St., Phila.
Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
Dicalite Co., 120 Wall St., N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Kay-Fries Chemicals, Inc., 180 Madison Ave., N. Y.
National Oil Prods. Co., Harrison, N. J.
Rohm & Haas Co., 222 W. Washington Sq., Phila.

AIR COMPRESSORS (see COMPRESSORS, AIR)

ALCOHOL (Ethyl and Denatured)
(see also Dealers)

American Coml. Alcohol Corp., 405 Lexington Ave., N. Y.
Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
Commerce Petroleum Co., 3042 Archer Ave., Chicago
Commercial Solvents Corp., 230 Park Ave., N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.

AROMATICS

FOR SOAP, DISINFECTANT & INSECTICIDE MANUFACTURERS

AROMATIC CHEMICALS . . . . . .

Manufactured at our Brooklyn factory under accurate chemical control, these aromatic chemicals are of the highest degree of purity, and are always of uniform quality. The following are of special interest to soap makers:

AMYL CINNAMIC ALDEHYDE
AMYL BENZOATE
BENZYLIDENE ACETONE
CITRAL
EUGENOL
GERANIOLS
GERANYL ACETATE
ISO BUTYL BENZOATE
ISO EUGENOL
LINALOOL
LINALYL ACETATE
METHYL PARA CRESOL
PARA CRESOL ACETATE
RHODINOL
TERPENYL ACETATE

PERFUMES FOR SOAPS . . . . . .

A complete range of floral notes, bouquets and oriental odors. *Will not discolor.* Special odors can be readily supplied. The facilities of our thoroughly equipped soap laboratory are available to assist you in your soap perfume problems.

WATER SOLUBLE PERFUMES . . . . . .

AQUAROMES—Completely soluble in water to a clear solution. A wide variety of odors for (Trade Marked) liquid soaps, soap base shampoos, theatre sprays, formaldehyde solutions, etc.

INSECTICIDE SPRAY PERFUMES . . . . . .

We manufacture a wide variety of "Kerex" neutralizers and odors for insecticide sprays. All of these odors are pleasant in character, powerful as to coverage and economical, costing on the average, less than ONE CENT TO PERFUME A GALLON OF SPRAY.

PERFUMES for DEODORANT BLOCKS and CRYSTALS

COLOROMES—Will perfume and color naphthalene and paradichlorbenzene in one simple (Trade Marked) operation. A wide variety of odors and colors are available. Perfume also supplied without color. With the use of Felton Coloromes, the odor remains until the last particle of naphthalene or para has evaporated.

SEND FOR CATALOG OF PRODUCTS

FELTON
CHEMICAL COMPANY, INC.
599 JOHNSON AVENUE, BROOKLYN, N. Y.

SAMPLES AND QUOTATIONS ON REQUEST

MANUFACTURERS OF AROMATIC CHEMICALS, NATURAL DERIVATIVES, PERFUME OILS, ARTIFICIAL FLOWER AND FLAVOR OILS

Branches in principal cities

Boston, Mass. 80 Boylston St.
Philadelphia, Pa. 15 Lombard St.
Sandusky, Ohio 1209 Buckingham St.
Chicago, Ill. 1200 N. Ashland Ave.
St. Louis, Mo. 4910 W. Pine Blvd.
New Orleans, La. Balter Bldg.
Los Angeles, Cal. 4727 W. Washington Blvd.
San Francisco, Cal. 707 Kohl Blvd.
Portland, Ore. 121 N.W. 5th Ave.
Montreal, Que., Canada 389 St. Paul St. W.
Toronto, Ont., Canada 218 Front St. W.
Denver, Colo. 1729 Arapahoe St.

ALCOHOL (Ethyl and Denatured) (Contd.)

Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Pennsylvania Sugar Co., 139 S. 3rd St., Phila.
Publicker Commercial Alcohol Co., 260 E. Broad St., Phila.
U. S. Industrial Chemicals, Inc., 60 E. 42nd St., N. Y.

ALCOHOL (Methyl or Wood)
(see also Dealers)

Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
Cliffs-Dow Chemical Co., Marquette, Mich.
E. W. Colledge, General Sales Agent, Inc., P. O. Box 389, Jacksonville, Fla.
Commercial Solvents Corp., 230 Park Ave., N. Y.
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Publicker Commercial Alcohol Co., 260 S. Broad St., Philadelphia
U. S. Industrial Chemicals, Inc., 60 E. 42nd St., N. Y.
Wood Products Co., Buffalo, N. Y.

ALCOHOL, ISO-PROPYL

Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Standard Alcohol Co., 26 Bway., N. Y.
U. S. Industrial Chemicals, Inc., 60 E. 42nd St., N. Y.

ALKALIES, see CAUSTIC SODA, SODA ASH, CAUSTIC POTASH, ETC.

ALUMINUM CHIPS (for Drain Solvent)

Aluminum Co. of Amer., Gulf Bldg., Pittsburgh
Belmont Smelting & Ref. Co., 318 Belmont Ave., Bklyn., N. Y.
Reynolds Metals Co., 19 Rector St., N. Y.

ALUMINUM STEARATE (see STEARATES)

ALUMS
(see also Dealers)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Armour Ammonia Wks., 1355 W. 31st St., Chicago
E. I. Du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Hercules Powder Co., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila. (Ammonia)
Rohm & Haas Co., Inc., 222 W. Washington Sq., Phila.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.
Stauffer Chem Co., 420 Lexington Ave., N. Y.

AMALGAMATORS (see SOAP MACHINERY)

AMMONIA, HOUSEHOLD (see HOUSEHOLD AMMONIA)

AMMONIA WATER
(see also Dealers)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Barrett Co., 40 Rector St., N. Y.
Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Eastern Inds., Ridgefield, N. J.
General Chemical Co., 40 Rector St., N. Y.
Mallinckrodt Chem. Wks., St. Louis
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Merck & Co., Rahway, N. J.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Rohm & Haas Co., Inc., 222 W. Washington Sq., Phila.
Jos. Turner & Co., Ridgefield, N. J.

AMMONIUM BI-FLUORIDE (see FLUORIDES)

AMMONIUM CARBONATE
(see also Dealers)

American-British Chm. Supplies, Inc., 180 Madison Ave., N. Y.
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Merck & Co., Rahway, N. J.
Jos. Turner & Co., Ridgefield, N. J.

AMMONIUM CHLORIDE

American Cyanamid & Chem. Co., 30 Rockefeller Plaza, N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Merck & Co., Rahway, N. J.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.

AMYL CINNAMIC ALDEHYDE (see AROMATIC CHEMICALS)

AMYL SALICYLATE (see AROMATIC CHEMICALS)

ANISE OIL (see ESSENTIAL OILS)

ANT POISONS

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
American Fluoride Corp., 151 W. 19th St., N. Y.
An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Calif.
Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
Barton Chemical Co., 3907 S. Langley Ave., Chicago
Buckeye Chem. & Specialty Co., 131 E. 23rd St., N. Y.
Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
Geo. H. Conn Co., Freeport, Ill.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Delta Chem. Co., 4 Payson Ave., N. Y.
Exterminating Materials Co., 555 W. 22nd St., N. Y.
Foote Mineral Co., 1609 Summer St., Phila.
Fuld Bros., Inc., 702 S. Wolfe St., Baltimore
Hysan Products Co., 2560 Armitage Ave., Chicago
Maywood Pest Exterminators, 1413 Washington Blvd., Maywood, Ill.
John Opitz, Inc., 50-14 39th St., Long Island City, N. Y.
Pfaltz & Bauer, Inc., Empire State Bldg., N. Y.
Ore & Chemical Corp., 80 Broad St., N. Y.
Soilicide Labs., 8 Laurel Pl., Upper Montclair, N. J.
Sennewald Drug Co., Inc., 2723 Chouteau Ave., St. Louis
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
U. S. Sanitary Spec. Corp., 435 S. Western Ave., Chicago
W-B Chemical Co., Mt. Vernon, N. Y.

APPLICATORS (for Floor Wax)

American Standard Mfg. Co., 2509 S. Green St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Empire Brush Wks., Port Chester, N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
H. Hertzberg & Son, Inc., 2300 Fifth Ave., N. Y.
Higley Chem. Co., Dubuque, Iowa
Hysan Products Co., 2560 Armitage Ave., Chicago
E. B Moore & Co., 185 N. Wabash Ave., Chicago
Palmer Prods., Inc., Waukesha, Wis.
Pioneer Mfg. Co, 3053 E. 87th St., Cleveland
Shane & Hays, Inc., 5300—21st St., Brooklyn, N. Y.
H. F. Staples Co., Medford, Mass.
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.

AROMATIC CHEMICALS (for Perfuming)

Allondon-Bayonne Co., 11 Park Place, N. Y.
American-British Chm. Supplies, Inc., 180 Madison Ave., N. Y.
van Ameringen-Haebler, Inc., 315 Fourth Ave., N. Y.

THE 8 AROMATIC CHEMICALS

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AROMATIC CHEMICALS (Contd.)

Aromatic Products, Inc., 15 E. 30th St., N. Y.
Arthur Bennett, Inc., 109 W. Hubbard St., Chicago
Ph. Chaleyer, Inc., 160 E. 56th St., N. Y.
Chemical Marketing Co., 10 E. 42nd St., N. Y.
Antoine Chiris Co., 115 E. 23rd St., N. Y.
Compagnie Parento, Inc., Croton-on-Hudson, N. Y.
Gerard J. Danco, Inc., 333 Sixth Ave., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
Dow Chemical Co., Midland, Mich.
P. R. Dreyer Inc., 119 W. 19th St., N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Felton Chemical Co., 603 Johnson Ave., Brooklyn
Firmenich & Co., 135 Fifth Ave., N. Y.
Florasynth Laboratories, 1513 Olmstead Ave., Bronx, N. Y.
Benj. French, Inc., 160 Fifth Ave., N. Y.
Fritzsche Brothers, Inc., 76 Ninth Ave., N. Y.
Fuld Bros., Baltimore
General Drug Co., 644 Pacific St., Brooklyn
Givaudan-Delawanna, Inc., 330 W. 42nd St., N. Y.
Heyden Chemical Corp., 50 Union Square, N. Y.
C. E. Ising Corp., Flushing, L. I., N. Y.
Kay-Fries Chemicals, Inc., 180 Madison Ave., N. Y.
Pierre Lemoine, Inc., 67 Cortland St., N. Y.
Geo. Lueders & Co., 427 Washington St., N. Y.
Magnus, Mabee & Reynard, 16 Desbrosses St., N. Y.
A. Maschmeijer, Jr., Inc., 45 West 16th St., N. Y.
Monsanto Chemical Works, 1724 S. 2nd St., St. Louis
Naugatuck Aromatics, 1230 6th Ave., N. Y.
Neumann-Buslee & Wolfe, 224 W. Huron St., Chicago
Norda Essential Oil & Chem. Co., 601 W. 26th St., N. Y.
Northwestern Chemical Co., Wauwatosa, Wis.
Orbis Products Corp., 215 Pearl St., N. Y.
Pfaltz & Bauer, Inc., 350 Fifth Ave., N. Y.
Polak's Frutal Wks., Inc., 36-14—35th St., L. I. City, N. Y.
Polak & Schwarz, Inc., 667 Washington St., N. Y.
Rifa-New York, Inc., 153 Waverly Pl., N. Y.
Roure-Dupont, 351 Fourth Ave., N. Y.
H. C. Ryland, Inc., 161 Water St., N. Y.
Schimmel & Co., 601 W. 26th St., N. Y.
Edwin Seebach Co., 912 Broadway, N. Y.
Wm. G. Sibbach & Co., 201 S. 2nd Ave., Maywood, Ill.
Standard Synthetics Co., 119 W. 25th St., N. Y.
Synfleur Scientific Labs., Monticello, N. Y.
A. M. Todd Co., Kalamazoo, Mich.
Tombarel Products Corp., 9 E. 19th St., New York
Trubek Labs., East Rutherford, N. J.
Ungerer & Co., 13 W. 20th St., N. Y.
Van Dyk & Co., 57 Wilkinson Ave., Jersey City, N. J.
Albert Verley, Inc., 1621 Carroll Ave., Chicago

ARSENATE OF LEAD (see LEAD ARSENATE)

ARSENICAL DIPS

Baird & McGuire, Inc., Holbrook, Mass.
Baird & McGuire Inc. of Mo., St. Louis.
Wm. Cooper & Nephews, 1909 Clifton Ave., Chicago
Fuld Bros., Baltimore
General Chemical Co., 40 Rector St., New York
James Good, Inc., Kensington, Phila.
Kemiko Mfg. Co., 500 Chancellor Ave., Irvington, N. J.
Koppers Co., Koppers Bldg., Pittsburgh
McLaughlin, Gormley King Co., Minneapolis
Thompson-Hayward Chemical Co., 2915 Southwest Blvd., Kansas City, Mo.
White Tar Co., Kearny, N. J.

ARSENIC (White Arsenic)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza., N. Y.
American Smelting & Refining Co.. 120 Broadway, N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Charles Hardy, Inc., 415 Lexington Ave., N. Y.
Harshaw Chemical Co., Cleveland
Innis, Speiden & Co., 117 Liberty St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.

ATOMIZERS (see SPRAYERS, BOTTLE)

AUTO SOAPS (see POTASH SOAPS)

BAGS (Cloth)

Bemis Bro. Bag Co., 601 S. 4th St., St. Louis
Central Bag & Burlap Co., 4513 S. Western Blvd., Chicago
Chase Bag Co., 155 E. 44th St., N. Y.
Dayton Bag & Burlap Co., Dayton, Ohio
Fulton Bag & Cotton Mills, Atlanta, Ga.
Hammond Bag & Paper Co., Wellsburg, W. Va.
Mente & Co., New Orleans, La.
Paper Service Co., Lockland, Cincinnati

BAGS AND BAG LINERS (Paper)

Arkell Safety Bag Co., 10 E. 40th St., N. Y.
Bemis Bro. Bag Co., 601 S. 4th St., St. Louis
Canister Co., Phillipsburg, N. J.
Chase Bag Co., 155 E. 44th St., N. Y.
Crepe-Kraft Co., 114 Adams St., Newark, N. J.
Hammond Bag & Paper Co., Wellsburg, W. Va.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
Paper Service Co., Box 107, Lockland, Cincinnati
St. Regis Paper Co., 230 Park Ave., N. Y.
Union Bag & Paper Co., 233 B'way, N. Y.

BAGS (Waterproof)

Bemis Bro. Bag Co., 601 S. 4th St., St. Louis
Chase Bag Co., 155 E. 44th St., N. Y.
Hammond Bag & Paper Co., Wellsburgh, W. Va.
Paper Service Co., P. O. Box 107, Lockland, Cincinnati
St. Regis Paper Co., 230 Park Ave., N. Y.

BALSAMS

van Ameringen-Haebler, Inc., 315 Fourth Ave., N. Y.
Antoine Chiris Co., 115 E. 23rd St., N. Y.
Aromatic Products, Inc., 15 E. 30th St., N. Y.
Gerard J. Danco, Inc., 333 Sixth Ave., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
P. R. Dreyer Inc., 119 W. 19th St., N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago
Florasynth Laboratories, 1513 Olmstead Ave., Bronx, N. Y.
Fritzsche Brothers, Inc., 76 Ninth Ave., N. Y.
Geo. Lueders & Co., 427 Washington St., N. Y.
Magnus, Mabee & Reynard, 16 Desbrosses St., N. Y.
Norda Essential Oil & Chem. Co., 601 W. 26th St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
S. B. Penick & Co., 132 Nassau St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Frank B. Ross Co., 79 Wall St., N. Y.
H. C. Ryland, Inc., 161 Water St., N. Y.
W. H. Scheel, Inc., 193 Water St., N. Y.
Schimmel & Co., 601 W. 26th St., N. Y.
Tombarel Products Corp., 9 E. 19th St., New York
Ungerer & Co., 13 W. 20th St., N. Y.
Albert Verley, Inc., 1621 Carroll Ave., Chicago

BARIUM CARBONATE

Alton Barium Prods. Co., Alton, Ill.
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Fezandie & Sperrle, 205 Fulton St., N. Y.
Foote Mineral Co., 1609 Summer St., Philadelphia
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Innis, Speiden & Co., 117 Liberty St., N. Y.
Merck & Co., Rahway, N. J.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

BARREL LINERS (see BAGS AND BAG LINERS)

BARRELS (Fibre)

Canister Co., Phillipsburg, N. J.
Carpenter Container Co., 147—41st St., Brooklyn
Champion Container Co., Water & Morris Sts., Phila.
Container Co., Van Wert, O.
Diamond State Fibre Co., Bridgeport, Pa.
Master Package Corp., Owen, Wisc.
Rogers Fibre Co., 210 Lincoln St., Boston
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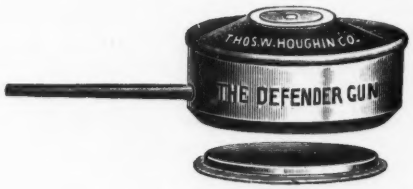

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American Cooperage Co., Maurer, N. J.
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Draper Mfg. Co., Cleveland
Fetter Steel Barrel Corp., Buffalo
Globe Steel Barrel Co., Cleveland
Manion Steel Barrel Co., Rouseville, Pa.
Meurer Steel Barrel Co., 105 Avenue L, Newark, N. J.
National Steel Barrel Co., 3860 E. 91st St., Cleveland
Niles Steel Prod. Co., 465 Walnut St., Niles, Ohio
Petroleum Iron Works Co., Sharon, Pa.
Pittsburgh Can Co., Pittsburgh
Pressed Steel Tank Co., Milwaukee, Wis.
Republic Steel Package Co., 7930 Jones Rd., Cleveland
St. Louis Steel Package Co., St. Louis
F. C. Thornton Co., 6712 Union Ave., Chicago
John Trageser Steam Copper Works,
Grand Ave., Maspeth, L. I., N. Y.
Wackman Welded Ware Co., 7th & Victor Sts.. St. Louis
Wheeling Corrugating Co., Wheeling, W. Va.
Wilson & Bennett Mfg. Co., 6532 S. Menard St., Chicago

BARRELS (Used Steel)

American Cooperage Co., Maurer, N. J.
Newark Steel Drum Co., Linden, N. J.
Newman Tallow & Soap Machinery Co., 1051 W. 35th St., Chicago

BARRELS (Wooden)

Allied Barrel Co., Oil City, Pa.
American Barrel Co., 205 Bridge St., Salem, Mass.
American Cooperage Co., Maurer, N. J.
Atlantic Tank & Barrel Corp., North Bergen, N. J.
Colwell Cooperage Co., Jersey Ave., Jersey City, N. J.
J. D. Hollingshead Co., 612 N. Michigan Ave., Chicago
Louisville Cooperage Co., Louisville, Ky.
Michel Cooperage Co., Sandusky, O.
Weinrick Cooperage Co., Burlington, Iowa
Western Cooperage Co., Portland, Oregon

BARREL TILTERS

Economy Eng. Co., 2651 W. Van Buren St., Chicago
Schwenck Safety Device Corp., 80 Broad St., N. Y.

BATH SALT COLORS (see COLORS)

BATH SALTS

Eagle Soap Corp., Huntington, Ind.
Jansen Soap & Chemical Co.,
324 Leavenworth St., San Francisco, Cal.
Lightfoot-Schultz Co., 1412 Park Ave., Hoboken, N. J.
Port Huron Detergent Co., Port Huron, Mich.
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
Solvay Sales Corp., 40 Rector St., N. Y. (Unperfumed)
Allen B. Wrisley, 6801 W. 65th St., Chicago

BAY OIL (see ESSENTIAL OILS)

BAY RUM

A. C. Drury & Co., 219 East North Water St., Chicago
Chas. L. Huisking & Co., 155 Varick St., N. Y.
Lanman & Kemp-Barclay Co., 135 Water St., N. Y.
McKesson & Robbins, 79 Cliff St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Tombarel Products Corp., 9 E. 19th St., New York
Ungerer & Co., 13 W. 20th St., N. Y.

BEES WAX (see WAXES)

BELLOWS, INSECT POWDER

Acmeline, Inc., Traverse City, Mich.
Central Rubber Products Co., 823 Broadway, N. Y. (Bulbs)
Electric Sprayit Co., 1415 Illinois Ave.,
Sheboygan, Wis.
Feeny Mfg. Co., Muncie, Ind.
Getz Exterminators, Inc., 1130 Pine St., St. Louis
Thomas W. Houchin Corp., 87 Ferry St., Jersey City, N. J. (also Bulbs)
Lowell Mfg. Co., North Pier Terminal, Chicago
Scollay Sprinkler & Bulb Co., Box 46, Sta. F, Bklyn., N. Y.

BENTONITE

American Colloid Co., 363 W. Superior St., Chicago
American Cyanamid & Chem. Corp.,
30 Rockefeller Plaza, N. Y.
Attapulgus Clay Co., 260 So. Broad St., Phila.
Chas. B. Chrystal Co., 11 Park Pl., N. Y.
Filtrol Corp., 315 W. 5th St., Los Angeles
Hammill & Gillespie, 225 Broadway, N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Natura Minerals Co., 108 W. 6th St., Los Angeles
Owyhee Chemical Products Co.,
300 W. Adams St., Chicago
L. A. Salomon & Bro., 216 Pearl St., N. Y.
Silica Products Co., 700 Baltimore Ave., Kansas City, Mo.
A. E. Starkie Co., 528 N. Cuyler Ave., Oak Park, Ill.
Tamms Silica Co., 228 N. La Salle St., Chicago
United Clay Mines Corp., 101 Oakland St., Trenton, N. J.
Charles A. Wagner Co., 809 Callowhill St., Phila.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.
Whittaker, Clark & Daniels, 260 W. Broadway, N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.
Wyodak Chemical Co., 4600 E. 71st St., Cleveland

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van Ameringen-Haebler, Inc., 315 Fourth Ave., N. Y.
Aromatic Products, Inc., 15 E. 30th St., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
Dow Chemical Co., Midland, Mich.
P. R. Dreyer Inc., 119 W. 19th St., N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Felton Chemical Co., 603 Johnson Ave., Brooklyn
Florasynth Laboratories, 1513 Olmstead Ave., Bronx, N. Y.
Fritzsche Brothers, Inc., 76 Ninth Ave., N. Y.
Givaudan-Delawanna, Inc., 330 W. 42nd St., N. Y.
Heyden Chem. Co., 50 Union Sq., N. Y.
Magnus, Mabee & Reynard, 16 Desbrosses St., N. Y.
Merck & Co., Rahway, N. J.
Monsanto Chemical Works, 1724 S. 2nd St., St. Louis
Norda Essential Oil & Chem. Co., 601 W. 26th St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
Schimmel & Co., 601 W. 26th St., N. Y.
Tombarel Products Corp., 9 E. 19th St., New York
Ungerer & Co., 13 W. 20th St., N. Y.
Van Dyk & Co., 57 Wilkinson Ave., Jersey City, N. J.
Albert Verley, Inc., 1621 Carroll Ave., Chicago

BENZENE (Benzol)

Barrett Co., 40 Rector St., N. Y.
S. H. Bell Co., 1407 Gulf Bldg., Pittsburgh
Wm. Cooper & Nephews, 1909 Clifton Ave., Chicago
Hydrocarbon Products, 500 Fifth Ave., N. Y.
William E. Jordan & Bro., 2590 Atlantic Ave., Brooklyn
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
Neville Co., Pittsburgh

BERGAMOT OIL (see ESSENTIAL OILS)

BICHROMATES

American-British Chm. Supplies, Inc., 180 Madison Ave., N. Y.
American Cyanamid & Chem. Corp.,
30 Rockefeller Plaza, N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
Merck & Co., Rahway, N. J.
Mutual Chem. Co. of America, 270 Madison Ave., N. Y.
Natural Prods. Refining Co., Jersey City, N. J.
Prior Chem. Corp., 420 Lexington Ave., N. Y.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
Jos. Turner & Co., Ridgefield, N. J.

BLEACHING AGENTS (Chlorine, Peroxide, Bichromates, etc.)

American Cyanamid & Chem. Corp.,
30 Rockefeller Plaza, N. Y.
Buffalo Electro Chem. Co., Buffalo, N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Hooker Electrochemical Co., Niagara Falls, N. Y.
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave, N. Y.

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BLEACHING AGENTS (Contd.)

Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Lucidol Corp., 293 Larkin St., Buffalo
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Niagara Alkali Co., 60 E. 42nd St., N. Y.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
Rohm & Haas Co., 222 W. Washington Sq., Phila.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Warner Chem. Co., Chrysler Bldg., N. Y.

BLEACHING CLAY (see CLAYS)

BLEACHING EARTHS (see also CLAYS)

American Colloid Co., 363 W. Superior St., Chicago
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Attapulgus Clay Co., 260 So. Broad St., Phila.
Chas. B. Chrystal Co., 11 Park Pl., N. Y.
Dicalite Co., 120 Wall St., N. Y.
Filtrol Corp., 315 W. 5th St., Los Angeles
Hammil & Gillespie, 225 Broadway, N. Y.
J. M. Huber, Inc., 460 W. 34th St., N. Y.
Illinois Silica Co., Cairo, Ill.
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Peerless Clay & Mineral Co., Pueblo, Colo.
L. A. Salomon & Bro., 216 Pearl St., N. Y.
A. E. Starkie Co., 528 N. Cuyler Ave., Oak Park, Ill.
Tamms Silica Co., 228 N. LaSalle St., Chicago
Whittaker, Clark & Daniels, 260 W. Broadway, N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.
Wyodak Chem. Co., 4600 E. 71st St., Cleveland

BLEACHING EQUIPMENT (for Oils), (see DEODORIZING EQUIPMENT)

BLEACHING POWDER (Chloride of Lime)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Hooker Electrochemical Co., Niagara Falls, N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Niagara Alkali Co., 60 E. 42nd St., N. Y.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.
Stauffer Chem Co., 420 Lexington Ave., N. Y.
Jos. Turner & Co., Ridgefield, N. J.

BLOCK HOLDERS (see HOLDERS, DEODORIZING BLOCK)

BLOWERS for POWDER INSECTICIDES (see BELLOWS)

BLOWERS, ELECTRIC (see SPRAYERS, ELECTRIC)

BLUING (see LAUNDRY BLUE)

BOILER COMPOUNDS

Allied Consolidated Industries, Trenton, N. J.
American Colloid Corp., 15 E. 26th St., N. Y.
Baum's Castorine Co., Rome, N. Y.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
Delta Chem. Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Fuld Bros., 702 S. Wolfe St., Baltimore
Goulard & Olena, Inc., 140 Liberty St., N. Y.
Hercules Chem. Co., 332 Canal St., N. Y.
Higley Chem. Co., Dubuque, Iowa
Kemiko Mfg. Co., 500 Chancellor Ave., Irvington, N. J.
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Palmer Products Co., Waukesha, Wisc.
Permutit Co., 330 W. 42nd St., N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Theo. B. Robertson Prods. Co., 700 Division St., Chicago
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
S. S. Stafford, Inc., 603 Washington St., N. Y.
John Sunshine Chem. Co., 604 W. Lake St., Chicago
Trojan Products & Mfg. Co., 3107 S. Wabash Ave., Chicago
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago

BOIS de ROSE OIL (see ESSENTIAL OILS)

BORAX

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
American Potash & Chem. Corp., 233 Broadway, N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Innis, Speiden & Co., 117 Liberty St., N. Y.
Pacific Coast Borax Co., 51 Madison Ave., N. Y.
Paper Makers Chemical Div., Hercules Powder Co., Wilmington, Del.
Stauffer Chem. Co., 420 Lexington Ave., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

BOTTLES

American Bottle Co., Toledo, O.
Anchor Hocking Glass Corp., Lancaster, Ohio
Capstan Glass Co., Connelsville, Pa.
Graham Glass Co., Evansville, Ind.
Hazel Atlas Glass Co., Wheeling, W. Va.
Kimble Glass Co., Vineland, N. J.
Maryland Glass Corp., Baltimore, Md.
Millville Bottling Wks., Millville, N. J.
Owens Illinois Glass Co., Toledo, O.
F. E. Reed Glass Co., 860 Maple St., Rochester, N. Y.
Root Glass Co., Terre Haute, Ind.
Ruth Glass Co., Conshohocken, Pa.
Tygart Valley Glass Co., Washington, Pa.
T. C. Wheaton Co., Millville, N. J.

BOTTLE FILLING MACHINERY (see FILLING MACHINERY, BOTTLES)

BOTTLE WASHERS (see WASHING MACHINERY, BOTTLES)

BOX LINERS (see BAG LINERS)

BOXES (Corrugated and/or Fibre)

Brooklyn Fibre Syndicate, Decatur St. & Irving Ave., Brooklyn
Cambridge Paper Box Co., 196 Broadway, Cambridge, Mass.
Consolidated Paper Co., Monroe, Mich.
Container Corp. of America, 111 W. Washington St., Chicago
Robert Gair Co., 155 E. 44th St., N. Y.
Hinde & Dauch Paper Co., 222 Decatur St., Sandusky, O.
F. J. Kress Box Co., 2930 Liberty Ave., Pittsburgh
Owens-Illinois Glass Co., Toledo, O.
River Raisin Paper Co., Monroe, Mich.

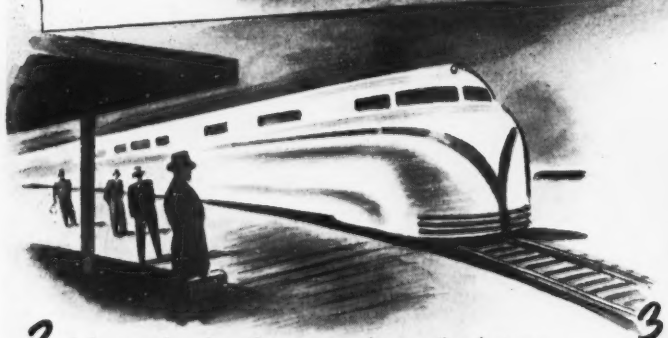
BOXES (Fancy Paper)

Alderman-Fairchild Co., 367 Orchard St., Rochester, N.Y.
Baxter Paper Co., Brunswick, Maine
F. N. Burt Co., Ltd., 540 Seneca St., Buffalo, N. Y.
C. J. Fox Co., 236 Abron St., Providence, R. I.
Foxon Paper Co., 230 West Park St., Providence, R. I.
Robert Gair Co., 155 E. 44th St., N. Y.

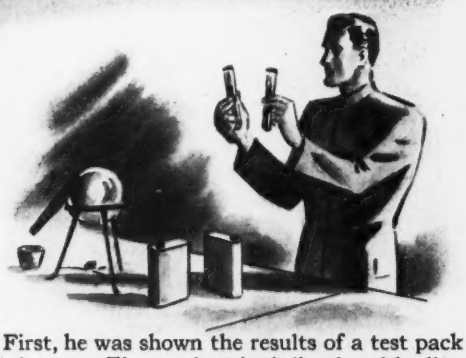
PUBLIC LIBRARY

THE INCIDENT OF THE PROGRESSIVE PRODUCER*

1 "Progressiveness promotes profit." This motto hangs on the office wall of C. R. Bennett, producer of liquid cleansers and allied products. Mr. Bennett's progressiveness led him to create a new product—a liquid soap. And being a long-time Continental customer, he asked us to tackle the job of packaging his latest development.

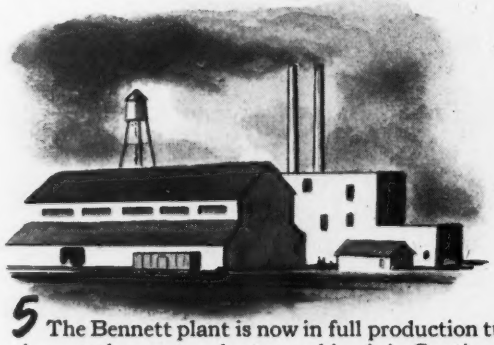


2 A few weeks after the new product arrived at our Chicago laboratories for preliminary packaging tests, Mr. Bennett boarded a train for Chicago. He knew the soap contained certain corrosive elements and was anxious to see the progress of our experiments.



3 First, he was shown the results of a test pack in *plain* cans. The product had discolored badly. In another test pack special enamel lining had been used. *Still* the soap had turned an unsightly color. The reason? The product's corrosive elements, after being in contact with metals and lacquers for a period, had caused the discoloration.

4 Couldn't something be done? The producer asked. Then he was informed that something *had* been done. He was given an ordinary can containing the product. When he poured out the liquid it looked . . . exactly as it should! A specific inhibitor had been developed which prevented the corrosion and subsequent discoloration.



5 The Bennett plant is now in full production turning out the new product—packing it in Continental cans—and marketing it profitably. This case is typical of hundreds of packaging problems involving research, development, and design solved by Continental every year. Have you such a problem? Consult Continental.

* The packaging facts of this story are taken from a true case history in our files. Names are necessarily fictitious.

CONTINENTAL CAN COMPANY
OFFICES AND PLANTS IN ALL PRINCIPAL CITIES

BOXES (Fancy Paper) (Contd.)

Gardner-Richardson Co., Middletown, O.
R. R. Heywood, Inc., 26th St. & 9th Ave., N. Y.
R. J. Kittredge Co., 812 W. Superior St., Chicago
Pictorial Package Co., Aurora, Ill.
Piqua Paper Box Co., Piqua, O.
Potomac Lithograph Mfg. Co., Washington, D. C.
W. C. Ritchie & Co., 400 S. Green St., Chicago
Robertson Paper Box Co., Montville, Conn.
Geo. Schmitt & Co., Grand & Florence Sts., Brooklyn
Strobridge Lithographing Co., Norwood Station, Cincinnati
Sutherland Paper Co., Kalamazoo, Mich.
U. S. Printing & Lithographing Co., Norwood, Cincinnati

BOXES (Fancy Wooden)

Pilliod Cabinet Co., Swanton, O.

BROKERS (Chemicals)

S. H. Bell Co., 1407 Gulf Bldg., Pittsburgh
John A. Chew, Inc., 60 E. 42nd St., N. Y.
Dickerson Co., Drexel Bldg., Phila.
Otto A. C. Hagen Co., Public Ledger Bldg., Phila.
Chas. L. Huisking & Co., 155 Varick St., N. Y.
Leo Pasternak, Inc., 110 William St., N. Y.
Thompson-Hayward Chem Co., Des Moines, Iowa
George Uhe, Inc., 80 Eighth Ave., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

BROKERS (Oils and Fats)

Irving R. Boody Co., 99 Wall St., N. Y.
Davidson Commission Co., 175 Jackson Blvd., Chicago
John W. Hall, 327 S. La Salle St., Chicago
Otto A. C. Hagen Co., Public Ledger Bldg., Phila.
Hentz & Co., 60 Beaver St., N. Y.
Chas., Hollingshead Co., Produce Exchange, N. Y.
Horner Commission Co., 15 William St., N. Y.
E. G. James Co., 332 S. La Salle St., Chicago
Miller & Co., 2401 Chestnut St., Philadelphia
Rayner & Stonington, Inc., 79 Wall St., N. Y.
J. H. Redding Co., 17 Battery Pl., N. Y.
Roesling, Monroe & Co., 99 Wall St., N. Y.
Snow Brokerage Co., 228 N. La Salle St., Chicago
Sterne & Son Co., Produce Exchange, N. Y.
Wm. M. Ware & Co., 88 Broad St., Boston
Weaver & Hugi, Inc., Produce Exchange Bldg., N. Y.
H. L. Webster & Co., 111 W. Washington St., Chicago
Welch, Holme & Clark Co., Inc., 563 Greenwich St., N. Y.
G. A. Wharry & Co., 24 State St., N. Y.
Wilbur-Ellis Co., 17 Battery Pl., N. Y.
Wilson Brokerage, Inc., Produce Exchange, N. Y.

BROOMS

Alabama Broom & Mattress Co., Huntsville, Ala.
Burdett-Rose Mfg. Co., 6100 Independence Rd., Kansas City, Mo.
Chattanooga Broom & Mop Co., Chattanooga, Tenn.
Detroit Quality Brush Mfg. Co., 5937 Michigan Ave., Detroit
Eagle Woodenware Co., Hamilton, O.
Illinois Brush Mfg. Co., 3316 Ogden Ave., Chicago
Kendallville Brush & Broom Co., Kendallville, Ind.
Tate Mfg. Co., 67 Sudbury St., Boston, Mass.
M. J. Toohey & Co., Fall River, Mass.

BRUSHES

American Standard Mfg. Co., 2509 Lime St., Chicago
Auburn Brush Co., Columbia, Pa.
Burdett-Rose Mfg. Co., 6100 Independence Rd., Kansas City, Mo.
Detroit Quality Brush Mfg. Co., 5937 Michigan Ave., Detroit
Jos. O. Flatt & Co., 141 Cedar St., Reading, Pa.
Flour City Brush Co., 301 Fifth Ave., So., Minneapolis
Higley Chemical Co., Dubuque, Iowa
J. I. Holcomb Co., Indianapolis
Illinois Brush Mfg. Co., 3316 Ogden Ave., Chicago
W. E. Kautenberg Co., P. O. Box 255, Freeport, Ill.
Kendallville Brush & Broom Co., Kendallville, Ind.
National Brush Co., Aurora, Ill.
New Jersey Brush Mfg. Co., Newton, N. J.
Opie Brush Co., Kansas City, Mo.
Ox Fibre Brush Co., Frederick, Md.
Pacific Coast Brush Co., Los Angeles
Palmer Prods., Inc., Waukesha, Wisc.
Pioneer Mfg. Co., Cleveland, O.
Silver-Chamberlin Co., Clayton, N. J.
Sullivan Brush Co., Terre Haute ,Ind.
Tate Mfg. Co., 67 Sudbury St., Boston, Mass.

CAMPHOR OIL, WHITE (see ESSENTIAL OILS)

CAN FILLING MACHINERY (see FILLING MACHINERY, CANS)

CAJUPUT OIL (see ESSENTIAL OILS)

CALCIUM STEARATE (see STEARATES)

CAMPHOR OIL, SASSAFRASSY (see ESSENTIAL OILS)

CANANGA OIL (see ESSENTIAL OILS)

CANDELILLA WAX (see WAXES)

CAN SPOUTS AND NOZZLES

Anchor Hocking Glass Corp., Lancaster, Ohio
Henry Barroll & Co., Inc., 270 Broadway, N. Y.
George D. Ellis & Sons, 309 N. 3rd St., Phila.
Standard Container Corp., Bloomfield, N. J.
U-Pressit Corp., 420 Lexington Ave., N. Y.
Williams Sealing Corp., Decatur, Ill.

CANS (Fibre or Paper)

American Can Co., 230 Park Ave., N. Y.
Cambridge Paper Box Co., 196 Broadway, Cambridge, Mass.
Canister Co., Phillipsburg, N. J.
Cin-Made Corp., 294 Eggleston Ave., Cincinnati
Cleveland Container Co., 10630 Berea Rd., Cleveland
Cross Paper Products Co., 2595 Third Ave., N. Y.
Fonda Container Co., 41 Park Row, N. Y.
Gardner-Richardson Co., Middletown, O.
Master Package Corp., Owen, Wis.
Middlesex Paper Tube Co., 1270 Broadway, N. Y.
Midwest Paper Container Co., 707 N. 3rd St., Minneapolis
National Paper Can Co., Cudahy, Wis.
R. C. Can Co., 121 Chambers St., St. Louis
W. C. Ritchie & Co., 8855 S. Baltimore Ave., Chicago
Sefton Fibre Can Co., 3275 Big Bend Blvd., St. Louis
Sutherland Paper Co., Kalamazoo, Mich.

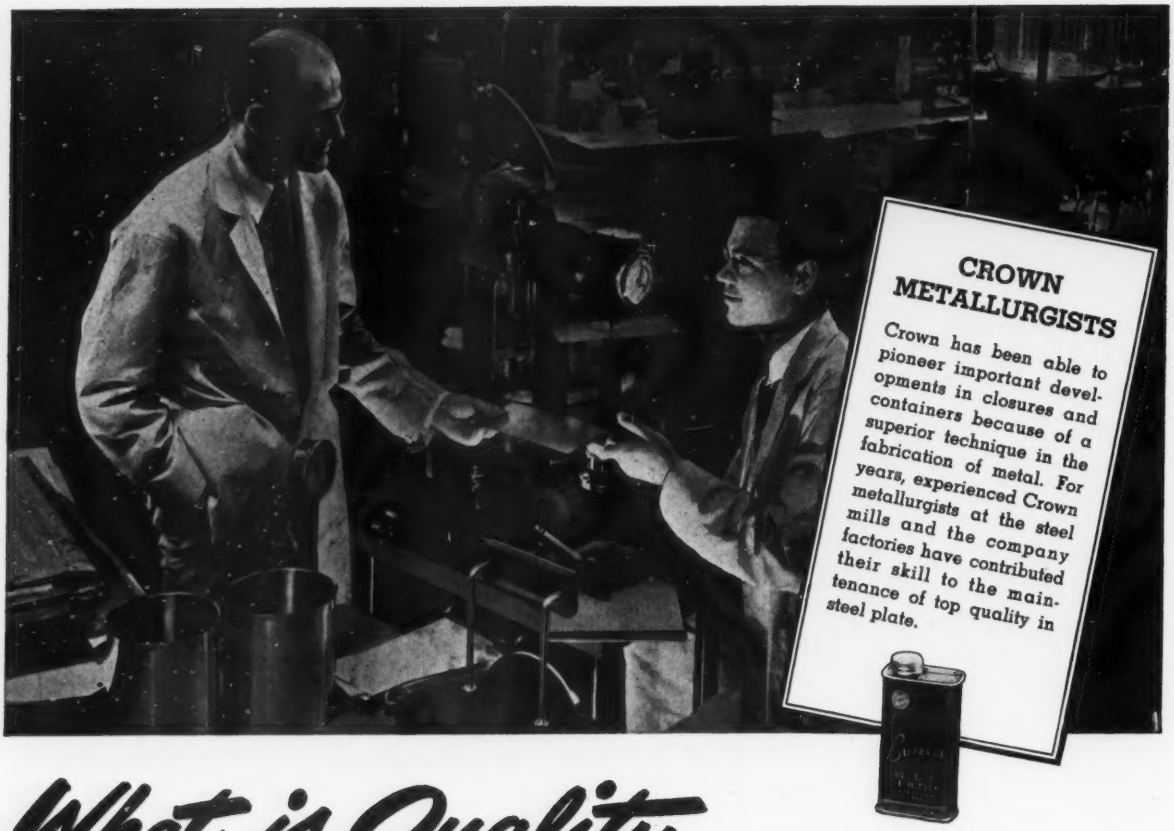
CANS (Sifter Top)

American Can Co., 230 Park Ave., N. Y.
Anchor Hocking Glass Corp., Lancaster, Ohio
Cambridge Paper Box Co., 196 Broadway, Cambridge, Mass.
Canister Co., Phillipsburg, N. J.
Cans, Incorporated, Chicago
Cleveland Container Co., 10630 Berea Rd., Cleveland
Cin-Made Corp., 294 Eggleston Ave., Cincinnati
Continental Can Co., Inc., 100 E. 42nd St., N. Y.
Crown Can Co., Erie Ave. & H St., Phila.
Giles Can Co., 2444 W. 16th St., Chicago
Middlesex Paper Tube Co., 1270 Broadway, N. Y.
National Can Co., 110 E. 42nd St., N. Y.
Owens-Illinois Can Co., Toledo, O.
R. C. Can Co., 121 Chambers St., St. Louis
Sefton Fibre Can Co., 3275 Big Bend Blvd., St. Louis
Standard Container, Inc., Bloomfield, N. J.
Sutherland Paper Co., Kalamazoo, Mich.

CANS (Steel) (see PAILS, Steel)

CANS (Tin)

American Can Co., 230 Park Ave., N. Y.
Anchor Hocking Glass Corp., Lancaster, Ohio
Central Can Co., 2415 W. 19th St., Chicago
Cans, Inc., 3217 W. 47th Pl., Chicago
J. L. Clark Mfg. Co., Rockford, Ill.
Columbia Can Co., 5221 Natural Bridge Ave., St. Louis
Continental Can Co., Inc., 100 E. 42nd St., N. Y.


CROWN METALLURGISTS
Crown has been able to pioneer important developments in closures and containers because of a superior technique in the fabrication of metal. For years, experienced Crown metallurgists at the steel mills and the company factories have contributed their skill to the maintenance of top quality in steel plate.

What is Quality in a Tin Can?

The story of Crown quality begins with the raw material . . . the selection of prime tinplate at the steel mills. From that point on, inspection after inspection, check after check, guarantee the maintenance of quality through every step of production.

Manufacturing facilities play no small part in safeguarding Crown quality. Crown production machinery is the most modern available . . . operated by men to whom "quality" is a tradition . . . supervised by engineers, technicians, metallurgists of proved experience at every step from tinplate to the perfectly finished can your product deserves!

CROWN CAN COMPANY, PHILADELPHIA, PA.
Division of Crown Cork and Seal Company
BALTIMORE ST. LOUIS HOUSTON MADISON ORLANDO
FORT WAYNE NEBRASKA CITY

INDEPENDENT AND HELPFUL CROWN CAN

CANS, TIN (Contd.)

Crown Can Co., Erie Ave. & H St., Phila.
George D. Ellis & Sons, 309 N. 3rd St., Phila.
Fein's Tin Can Co., Bush Terminal, Brooklyn
General Can Co., 1603 S. Canal St., Chicago
Heekin Can Co., Cincinnati
National Can Co., 110 E. 42nd St., N. Y.
Owens-Illinois Can Co., Toledo, O.
Phoenix Metal Cap Co., 244 W. 16th St., Chicago
W. F. Robertson Steel & Iron Co., Springfield, O.
St. Louis Can Co., 904 S. 14th St., St. Louis
Standard Container, Inc., Bloomfield, N. J.

CAPPING MACHINERY

Alsop Engineering Corp., 100 High St., Milldale, Conn.
Anchor Hocking Glass Corp., Lancaster, Ohio
Consolidated Packaging Machinery Corp.,
1400 West Ave., Buffalo
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Crown Cork & Seal Co., Baltimore, Md.
Filter Paper Co., 57 E. 24th St., Chicago
R. G. Haskins Co., 4642 W. Fulton St., Chicago
Karl Kiefer Machine Co., 919 Martin St., Cincinnati, Ohio
Ludcke Co., 41 N. Beacon St., Watertown, Mass.
Phoenix Metal Cap Co., 2444 W. 16th St., Chicago
Pneumatic Scale Corp., Norfolk Downs, Mass.
Scientific Filter Co., 1 Franklin Sq., N. Y.
Triangle Package Machy. Co.,
910 N. Spaulding Ave., Chicago

CAPPING MATERIALS

Anchor Hocking Glass Corp., Lancaster, O.
Henry Barroll & Co., Inc., 100 E. 42nd St., N. Y.
Du Pont Cellophane Co., 2 Park Ave., N. Y.
Sylvania Industrial Corp.. Chanin Bldg., N. Y.
Williams Sealing Corp., Decatur, Ill.

CAPS (Molded)

Anchor Hocking Glass Corp., Lancaster, Ohio
Armstrong Cork & Insulation Co., Lancaster, Pa.
General Plastics, Inc., N. Tonawanda, N. Y.
Owens-Illinois Glass Co., Toledo, O.
Resinox Corp., Terre Haute, Ind.
Toledo Synthetic Prods. Co., Toledo, O.

CAPS (Metal)

Aluminum Co. of America, Gulf Bldg., Pittsburgh
Anchor Hocking Glass Corp., Lancaster, Ohio
Armstrong Cork & Insulation Co., Lancaster, Pa.
Cans, Inc., 321 W. Ohio St., Chicago
Closure Service Co., Toledo, Ohio
Crown Cork & Seal Co.,
Eastern Ave. & Kresson St., Baltimore
George D. Ellis & Sons. 309 N. 3rd St., Phila.
Ferdinand Gutmann & Co., 3611 14th Ave., Brooklyn
National Can Co., 110 E. 42nd St., N. Y.
National Seal Co., 14th Ave. & 37th St., Brooklyn
Owens-Illinois Glass Co., Toledo, Ohio
Phoenix Metal Cap Co., 224 W. 16th St., Chicago
Standard Container, Inc., Broomfield, N. J.
Williams Sealing Corp., Decatur, Ill.

CARAWAY OIL (see ESSENTIAL OILS)

CARBOLIC ACID, CRUDE (see PHENOL)

CARBON BISULFIDE
(see also Dealers)

Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Merck & Co., Rahway, N. J.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Stauffer Chem. Co., 420 Lexington Ave., N. Y.
Warner Chemical Co., 405 Lexington Ave., N. Y.

CARBON TETRACHLORIDE
(see also Dealers)

J. T. Baker Chemical Co., Phillipsburg, N. J.
Brown Co., Portland, Me.
Diamond Alkali Corp., 535 Smithfield St., Pittsburgh
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Merck & Co., Rahway, N. J.
Niagara Smelting Corp., Niagara Falls, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Phila.
Stauffer Chem. Co., 420 Lexington Ave., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Warner Chemical Co., 405 Lexington Ave., N. Y

CARNAUBA WAX (see WAXES)

CARRIERS, AGRICULTURAL DUST (see CLAYS)

CARTON HANDLING SYSTEMS

J. L. Ferguson Co., Joliet, Ill.
Filter Paper Co., 57 E. 24th St., Chicago
Self-Lifting Piano Truck Co., Findlay, Ohio
Stephans-Adamson Mfg. Co., Aurora, Ill.
Weigh Right Automatic Scale Co., Joliet, Ill.

CARTON LINING MACHINES (see LINING MACHINERY)

CARTON SEALING MACHINERY (see SEALING MACHINERY)

CARTONING MACHINERY

Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N.Y. (Used)
J. L. Ferguson Co., Joliet, Ill.
Johnson Automatic Sealer Co., Battle Creek, Mich.
R. A. Jones & Co., Cincinnati, O.
Pneumatic Scale Corp., Norfolk Downs, Mass.
F. B. Redington Co., 112 S. Sangamon St., Chicago.
Stokes & Smith Co., 4915 Summerdale Ave., Phila, Pa.
Triangle Package Machinery Co, 906 N. Spaulding Ave., Chicago
Weigh Right Automatic Scale Co., Joliet, Ill.

CARTONS (Display and Knock Down)

Alderman-Fairchild Co., Rochester, N. Y.
F. N. Burt Co., 540 Seneca St., Buffalo, N. Y
Consolidated Paper Co, Monroe, Mich.
Robert Gair Co., 155 E. 44th St., N. Y.
Gardner-Richardson Co., Middletown, O.
Nevins-Church Co., 250 Park Ave., N. Y.
New England Card & Paper Co., Springfield, Mass.
Pictorial Package Co., Aurora, Ill.
Randolph Box & Label Co., 843 W. VanBuren St., Chicago
W. C. Ritchie & Co., 8855 S. Baltimore Ave., Chicago
Robertson Paper Box Co., Inc., Montville, Conn.
George Schmitt & Co., Grand & Florence Sts., Brooklyn
Sutherland Paper Co., Kalamazoo, Mich.
U. S. Printing & Lithographing Co., Cincinnati, O.

CASE SEALING MACHINERY (see SEALING MACHINERY)

CASEIN

American-British Chem. Supplies, Inc., 180 Madison Ave., N. Y.
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Casein Co. of America, Div. of The Borden Co., 350 Madison Ave., N. Y.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Land-o-Lakes Creameries, Minneapolis
National Casein Co, 603 W. 80th St., Chicago
Paper Makers Chemical Corp., Kalamazoo, Mich.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

CASES (Fibre) see BOXES, CANS (Fibre)

CASES (Corrugated) see BOXES

CASSIA OIL (see ESSENTIAL OILS)

CASTILE SOAP, BAR

Armour Soap Wks., 1355 W. 31st St., Chicago
Conti Products Corp., 155 Varick St., N. Y.
Hockwald Chem. Co., 135 Mississippi St., San Francisco

COLUMBIA PRODUCTS
FOR GOOD SOAP-MAKING

You can count on Columbia Soda Ash and Caustic Soda to do their jobs supremely well. Because they are made and safeguarded during shipment with one single aim—to deliver these important products in the most economically usable form to make your processing run more smoothly—and to do their full share in making your products worthy in every respect to bear your own good name.

CAUSTIC SODA
76% Flake—50% and 73% Liquid

Columbia Caustic Soda is especially desirable for soap-making because of its high purity and freedom from metallic contamination.

The 76% Flake product is available in 400-lb. drums. The 50% and 73% Liquid grades are shipped in tank cars of notably improved design which effectively prevent crystallization. The exclusive Columbia protective coating used on these cars prevents metallic contamination en route.

SODA ASH
Light—Dense—Feather

Prepared to rigid specifications which have been developed through forty years' experience in meeting the requirements of the Soap Industry.

Our Technical Service Department will gladly cooperate in developing the most advantageous use of these or other Columbia products in your processes.

PITTSBURGH PLATE GLASS COMPANY

Columbia Chemical Division

COLUMBIA

COLUMBIA CHEMICALS

30 ROCKEFELLER PLAZA, NEW YORK, N. Y.

CHICAGO • BOSTON • ST. LOUIS
PITTSBURGH • CINCINNATI • CLEVELAND
MINNEAPOLIS • PHILADELPHIA

CASTILE SOAP, BAR (Contd.)

Kranich Soap Co., 54 Richards St., Brooklyn
Leghorn Trading Co., 21 West St., N. Y.
Lockwood-Brackett Co., Waltham Station, Boston
Los Angeles Soap Co., Los Angeles, Calif.
Newell Gutradt Co., 350 Fremont St.. San Francisco
Peck's Prods. Co., 5238 N. 2nd St., St. Louis
Procter & Gamble Co., Ivorydale, O.
Geo. W. Schmidt Co., 236 W. North Ave., Chicago
John T. Stanley Co., 642 W. 30th St., N. Y.
Superior Soap Corp., 121 Nostrand Ave., Bklyn.
Allen B Wrisley Co., 6801 W. 65th St., Chicago

CASTILE SOAP, LIQUID

Ampion Corp., 4-88—47th Ave., Long Island City, N. Y.
Antiseptol Co., 5524 Northwest Highway, Chicago
Baums Castorine Co., 200 Matthew St., Rome, N. Y.
Chicago Sanitary Prods Co., 3100 S. Throop St., Chicago
Clifton Chemical Co., 247 Front St., N. Y.
Davies-Young Soap Co., Dayton, O.
Eagle Soap Corp., Huntington, Ind.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., Kensington, Phila.
Haag Laboratories, Inc., 6101 S. May St., Chicago
Higley Chem. Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Hunt Mfg. Co., Lisbon Rd., Cleveland
Kranich Soap Co., 54 Richards St., Brooklyn
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Moore Bros. Co., 67 Vestry St., N. Y.
Palmer Products, Inc., Waukesha, Wisc.
Peck's Prods. Co., 5238 N. 2nd St., St. Louis
Geo. A. Schmidt Co., 236 W North Ave, Chicago
John T. Stanley Co., 642 W. 30th St., N. Y.
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Superior Soap Corp., 121 Nostrand Ave., Bklyn.
U. S. Sanitary Spec. Corp., 435 S. Western Ave., Chicago
Allen B. Wrisley Co., 6801 W 65th St., Chicago

CASTOR OIL
(see also Dealers)

Archer-Daniels-Midland Co., Minneapolis
Baker Castor Oil Co., 120 Broadway, N. Y.
Balfour, Guthrie & Co., 67 Wall St., N. Y.
T. G. Cooper & Co., 47 N. 2nd St., Phila.
Otto A. C. Hagen Co., 929 Public Ledger Bldg., Phila.
Spencer Kellogg & Sons, Buffalo, N. Y.
National Oil Products Co., Harrison, N. J.
Pacific Vegetable Oil Corp., 62 Townsend St., San Francisco
J. H. Redding, Inc., 17 Battery Place, N. Y.
Richards Chem. Wks., Warren & Morris Sts., Jersey City, N. J.
Arthur C. Trask Co., 4103 S. La Salle St., Chicago
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

CATTLE DIPS AND SPRAYS
(see also Sheep Dips)

An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Cal.
Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
Baird & McGuire, Holbrook, Mass.
Baird & McGuire, Inc., of Mo.. St. Louis
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Chemical Compounding Corp., 262 Huron St., Brooklyn
Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 2526 W. Congress St., Chicago
Clifton Chemical Co., 247 Front St., N. Y.
Crystal Soap & Chem. Co., 6300 State Rd., Phila.
Delta Chem. Co., 4 Payson Ave., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Goulard & Olena, 140 Liberty St., N. Y.
Haag Laboratories, Inc., 6101 S. May St., Chicago
Higley Chem. Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
James Huggins & Son, 239 Medford St., Malden, Mass.
Hunt Mfg. Co., Lisbon Rd., Cleveland
William E. Jordan & Bros., 2590 Atlantic Ave., Brooklyn
Kemiko Mfg. Co., 500 Chancellor Ave., Irvington, N. J.
Koppers Co, Koppers Bldg., Pittsburgh, Pa.
McLaughlin, Gormley King Co., Minneapolis, Minn.
North Coast Soap & Chem. Wks., Seattle, Wash.
Peck's Prod. Co., 522-40 N. 2nd St., St. Louis
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Schaeffer Bros. & Powell Mfg. Co., 102 Barton St., St. Louis
Shores Co., Cedar Rapids, Ia.
Standard Oil Co. (Calif.), 225 Bush St., San Francisco
Standard Oil Co. (Ohio), Midland Bldg., Cleveland
Thompson-Hayward Chem. Co., 2915 Southwest Blvd., Kansas City, Mo.
Tobacco By-Products & Chem. Corp., Louisville, Ky.
Victory Chem. Co., 148 Fairmont Ave., Phila.
Water-Type Spray Co., 1128 E. 62nd St., Chicago
Robert C. White Co., Falls of Schuylkill, Phila.
White Tar Co., Kearny, N. J.

CATTLE SPRAY BASE (see PETROLEUM BASES)

CAUSTIC POTASH (see POTASH, CAUSTIC)

CAUSTIC SODA
(see also Dealers)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Belle Alkali Co., Belle, W. Va.
Brown Company, Portland, Me.
Champion Fibre Co., Canton, N. C.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Great Western Electrochemical Co., San Francisco
Hooker Electrochemical Co., Niagara Falls, N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Kimberley-Clark Paper Co., Neenah, Wis.
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Michigan Alkali Co., 60 E. 42nd St., N. Y.
Michigan Electrochemical Co., Menominee, Mich.
Niagara Alkali Co., 60 E. 42nd St., N. Y.
Niagara Smelting Corp., Niagara Falls, N. Y.
Oxford Paper Co., White Mountains, N. H.
Pennsylvania Salt Mfg. Co., Widener Bldg., Phila.
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Stauffer Chem. Co., 420 Lexington Ave., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Warner Chemical Co., 405 Lexington Ave., N. Y.
Welch, Holme & Clark, 563 Greenwich St., N. Y.

CEDAR LEAF OIL (see ESSENTIAL OILS)

CEDARWOOD OIL (see ESSENTIAL OILS)

CERESIN WAX (see WAXES)

CHALK (Calcium Carbonate)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
H. J. Baker & Bro., 271 Madison Ave., N. Y.
Binney & Smith Co., 41 E. 42nd St., N. Y.
Charles B. Chrystal Co., 11 Park Pl., N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
E. I. Du Pont de Nemours & Co., Wilmington, Del.
A. C. Drury & Co., 219 East North Water St., Chicago
Fezandie & Sperrle, 205 Fulton St., N. Y.
E. Fougera & Co., 41 Maiden Lane, N. Y.
Goris & Arnstein, 37th & Racine Ave., Chicago
K. F. Griffiths Co., 110 E. 42nd St., N. Y.
Hammill & Gillespie, 225 Broadway, N. Y.
Charles Hardy, Inc., 415 Lexington Ave., N. Y.
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Innis Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.

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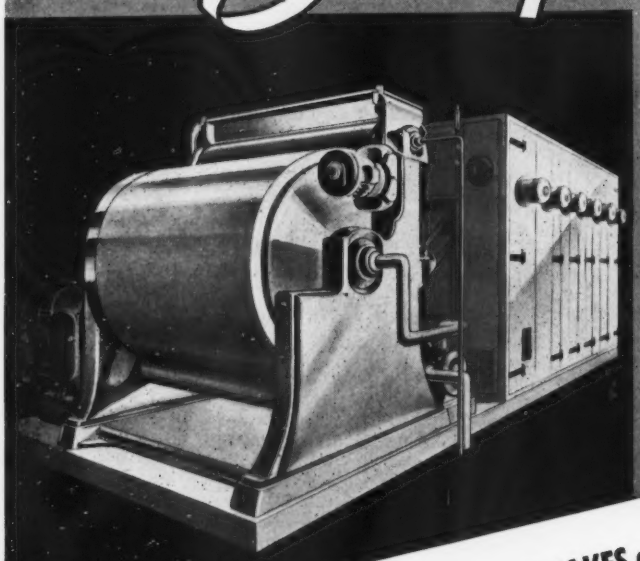

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Charles A. Wagner Co., 809 Callowhill St., Phila.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

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Allied Industrial Prods. Co., 17 N. Elizabeth St., Chicago
Amer. Sponge & Chamois Co., 47 Ann St., N. Y.
Atlas Sponge Co., 291 Church St., N. Y.
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E. I. Du Pont de Nemours & Co., Wilmington, Del.
Great Eastern Sponge & Chamois Co., 833 N. Patt. Pk. Ave., Baltimore
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Schroeder & Tremayne, 500 N. Coml. St., St. Louis

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William Garrigue & Co., 9 S. Clinton St., Chicago
Houchin Machy. Co., Hawthorne, N. J.
Huber Machine Co., 259—46th St., Brooklyn
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Proctor & Schwartz, 7th St. & Tabor Rd., Philadelphia
C. G. Sargent's Sons Corp., Graniteville, Mass.
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Wurster & Sanger, Inc., 5201 S. Kenwood Ave., Chicago

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Chicago Sanitary Products Co., 3100 S. Throop St., Chicago
Colgate-Palmolive-Peet Co., Jersey City, N. J.
Du Bois Soap Co., Cincinnati, Ohio
J. Eavenson & Sons, Camden, N. J.
Hewitt Soap Co., Dayton, Ohio
Holbrook Mfg. Co., Cole & 18th St., Jersey City
Lever Bros. Co., Cambridge, Mass.
Los Angeles Soap Co., Los Angeles, Calif.
Geo. E. Marsh Co., 200 Broadway, Cambridge, Mass.
National Milling & Chem. Co., Manayunk, Phila.
National Oil Prods. Co., Harrison, N. J.
National Soap Co., 357 South 25th St., Tacoma, Wash.
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Electro Bleaching Gas Co., 60 E. 41st St., N. Y.
Hooker Electrochemical Co., Quality St., Niagara Falls, N. Y.
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Michigan Alkali Co., 60 E. 42nd St., N. Y.
Monsanto Chemical Works, 1724 S. 2nd St., St. Louis
Niagara Alkali Co., 60 E. 42nd St., N. Y.
Pennsylvania Salt Mfg. Co., Widener Bldg., Phila.
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
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Jos. Turner & Co., Ridgefield, N. J.
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Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Interstate Color Co., 5 Beekman St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Krembs & Co., 669 W. Ohio St., Chicago
Magnus, Mabee & Reynard, 16 Desbrosses St., N. Y.
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Edwin Seebach Co., 912 Broadway, N. Y.
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CITRONELLAL (see AROMATIC CHEMICALS)

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Chas. B. Chrystal Co., 11 Park Pl., N. Y.
Dicalite Co., 120 Wall St., N. Y.
A. C. Drury & Co., 219 E. N. Water St., Chicago
Fezandie & Sperrle, 205 Fulton St., N. Y.
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Hammil & Gillespie, 225 Broadway, N. Y.
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J. M. Huber, Inc., 460 W. 34th St., N. Y.
Illinois Silica Co., Cairo, Ill.
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
International Silica Co., Cairo, Ill.
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A. E. Starkie Co., 528 N. Cuyler Ave., Oak Park, Ill.
Tamms Silica Co., 228 N. LaSalle St., Chicago
United Clay Mines Corp., 101 Oakland St., Trenton, N. J.
Charles A. Wagner Co., 809 Callowhill St., Phila.
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Armour & Co., 1355 W. 31st Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Barton Chemical Co., 3907 S. Langley Ave., Chicago
Cenol Co., 4250 N. Crawford Ave., Chicago
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Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14 37th Ave., Long Island City, N. Y.
Crystal Soap & Chemical Co., 6300 State Rd., Phila.
Curran Corp., Malden, Mass.
Davies-Young Soap Co., Dayton, Ohio
Delta Chemical Co., 4 Payson Ave., N. Y.
Dri-Brite, Inc., 4443 Cook Ave., St. Louis
E. I. Du Pont de Nemours & Co., Wilmington, Del.
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Hull Co., 305 Washington St., Brooklyn
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M. & H. Laboratories, 2703 Archer Ave., Chicago
Midway Chem. Co., 5235 W. 65th St., Chicago
Moore Bros. Co., 67 Vestry St., New York
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Palmer Products, Inc., Waukesha, Wisc.
Richards Chem. Wks., Warren & Morris Sts., Jersey City, N. J.
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Rochester Sanitary Prods. Co., 874 Seward St., Rochester, N. Y.
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Trojan Prods. & Mfg. Co., 3107 S. Wabash Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Uncle Sam Chemical Co., 329 E. 29th St., New York City
U. S. Sanitary Spec. Corp., 435 So Western Ave, Chicago
White Tar Co., Kearny, N. J.

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Armour & Co., 1355 W. 31st St., Chicago
Barton Chemical Co., 3907 S. Langley Ave., Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Beach Soap Co., Lawrence, Mass.
Blockson Chemical Co., Joliet, Ill.
Buck-Jack Co., 3056 Federal St., Baltimore
California Industrial Minerals Co., Friant, Calif.
Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Clifton Chem. Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14 37th Ave., Long Island City, N. Y.
Columbia Soap & Chem. Co., Inc., 217-221 Clara St., San Francisco
Cowles Detergent Co., Cleveland, Ohio
Crystal Labs., Inc., 21 W. Park Way, N. E., Pittsburgh
Cudahy Packing Co., 221 N. LaSalle St., Chicago
Davies-Young Soap Co., Dayton, O.
Delta Chemical Co., 4 Payson Ave., N. Y.
Diamond Alkali Co., Standard Silicate Div., 535 Smithfield St., Pittsburgh
Eagle Soap Corp., Huntington, Ind.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Goulard & Olena, Inc., 140 Liberty St., N. Y.
Haag Laboratories, Inc., 6101 S. May St., Chicago
Hercules Chem. Co., 332 Canal St., New York
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 30 Bluxome St., San Francisco
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Hunt Mfg. Co., Lisbon Rd., Cleveland
H. Kohnstamm & Co., 91 Park Pl., N. Y.
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Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Los Angeles Soap Co., Los Angeles, Calif.
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Mechling Bros. Chemical Co., Camden, N. J.
M. & H. Laboratories, 2703 Archer Ave., Chicago
Midway Chemical Co., 5235 W. 65th St., Chicago
Napthole, Inc., 15 E. 26th St., New York
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National Oil Prods. Co., Harrison, N. J.
National Soap Co., 357 South 25th St., Tacoma, Wash.
North Coast Soap & Chem. Wks., Seattle, Wash.
Pacific Chem. Co., 1421 N. Main St., Los Angeles
Palmer Products, Inc., Waukesha, Wisc.
Paper Makers Chemical Div., Hercules Powder Co., Wilmington, Del.
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Procter & Gamble Co., Ivorydale, O.
Richards Chem. Wks., Warren & Morris Sts., Jersey City, N. J.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
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Solvay Sales Corp., 40 Rector St., N. Y.
L. Sonneborn Sons, 88 Lexington Ave., N. Y.
S. & S. Soap Co., 324 Barretto St., Bronx, N. Y.
Standard Silicate Div., Diamond Alkali Co., 1622 Koppers Bldg., Pittsburgh
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John Sunshine Chem. Co., 604 W. Lake St., Chicago
Thompson-Hayward Chem. Co., 2915 Southwest Blvd., Kansas City, Mo.
Trojan Prods. & Mfg. Co., 3107 S. Wabash Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
United Cleanser Mfg. Co., Cambridge, Mass.
U. S. Sanitary Spec. Corp., 435 S. Western Ave., Chicago
V. C. Products Co, Philadelphia
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

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Armour & Co., 1355 W. 31st St., Chicago
Atlantic Refining Co., 260 South Broad St., Phila.
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Clifton Chem. Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14 37th Ave., Long Island City, N. Y.
Crystal Soap & Chemical Co., 6300 State Rd., Phila.
Delta Chemical Co., 4 Payson Ave., N. Y.
Dow Chemical Co., Midland, Mich.
Elkay Products Corp., 323 W. 16th St., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 Susquehanna Ave., Phila.
Hubman Supply Co., 225 N. 4th St., Columbus, O.
James Huggins & Son, Malden, Mass.
Hull Co., 305 Washington St., Brooklyn
La Maison Prods. Inc., So. York St., Brooklyn, N. Y.
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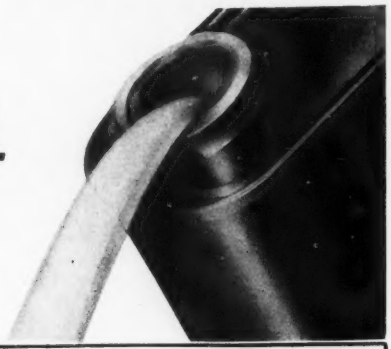

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Trojan Prods. & Mfg. Co., 3107 S. Wabash Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
White Tar Co. of N. Y., Kearny, N. J.

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George G. Rodgers Co., 183 Varick St., N. Y.

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Henry Barroll & Co., Inc., 100 E. 42nd St., N. Y.
Closure Service Co., Toledo, O.
Crown Cork & Seal Co., Baltimore
Phoenix Metal Cap Co., 224 W. 16th St., Chicago
Williams Sealing Corp., Decatur, Ill.

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COAL TAR DISINFECTANTS (see DISINFECTANTS)

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Baird & McGuire, Inc., of Mo., St. Louis
Barrett Co., 40 Rector St., N. Y.
S. H. Bell Co., 1407 Gulf Bldg., Pittsburgh
Commerce Petroleum Co., 3042 Archer Ave., Chicago
Wm. Cooper & Nephews, 1909 Clifton Ave., Chicago
E. I. Du Pont de Nemours & Co., Wilmington, Del.
James Huggins & Son, Malden, Mass.
Innis, Speiden & Co., 117 Liberty St., N. Y.
William E. Jordan & Bro., 2590 Atlantic Ave., Brooklyn
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Monsanto Chemical Works, 1724 S. 2nd St., St. Louis
Neville Co., Pittsburgh, Pa.
Pittsburgh Coal Carbonization Co., Oliver Bldg., Pittsburgh
Reilly Tar & Chemical Co., Indianapolis
Standard Naphthalene Prods. Co., Jacobus Ave., S. Kearny, N. J.
White Tar Co., Kearny, N. J.

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Spencer Kellogg & Sons, Buffalo, N. Y.
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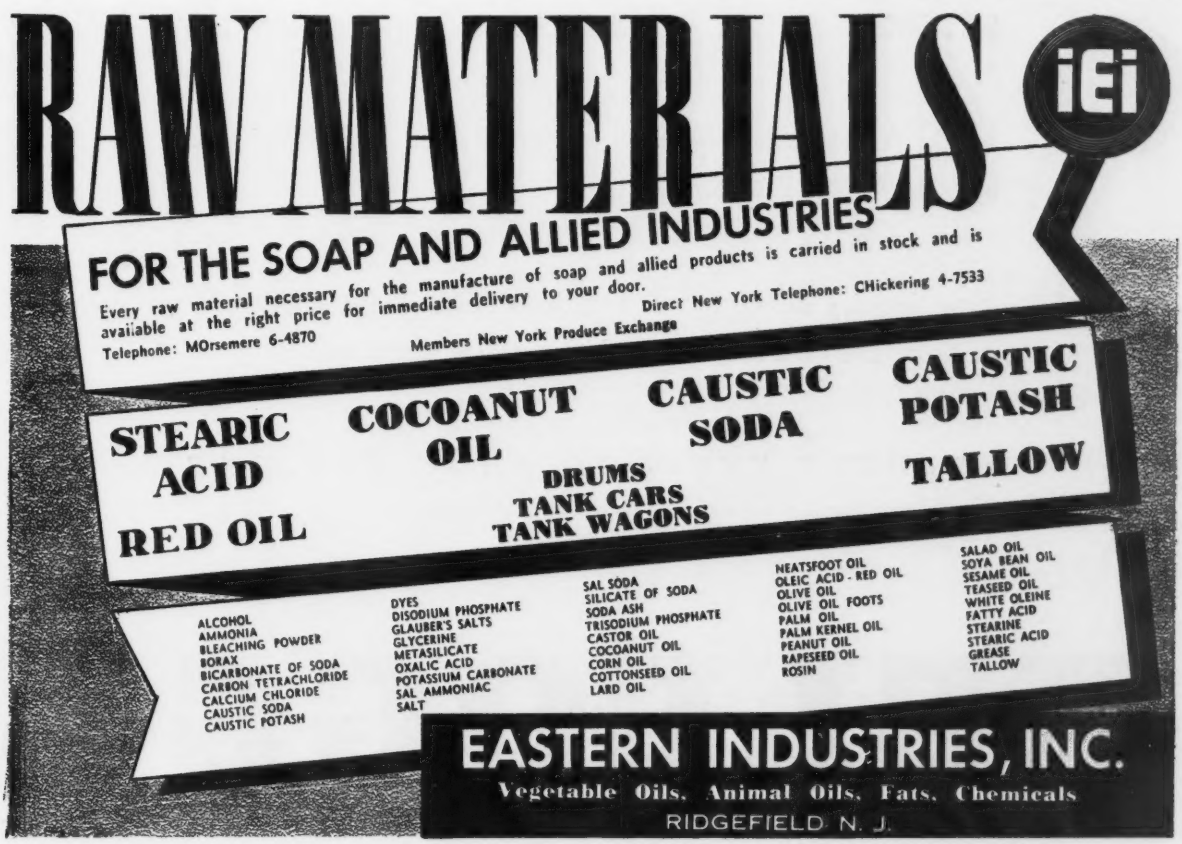
(see also Brokers and Dealers)

Atkins, Kroll & Co., 250 California St., San Francisco
Balfour, Guthrie & Co., 67 Wall St., N. Y.
Best Foods, Inc., 88 Lexington Ave., N. Y.
Capital City Products Co., Columbus, O.
Durkee Famous Foods, Inc., 2670 Elston Ave., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
El Dorado Oil Wks., 230 California St., San Francisco
Franklin Baker Co., 1500 Bloomfield St., Hoboken, N. J.
Spencer Kellogg & Sons, Buffalo, N. Y.
Los Angeles Soap Co., Los Angeles, Calif.
Pacific Veg. Oil Corp., 62 Townsend St., San Francisco



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Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

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COCONUT OIL BASE SOAP (see POTASH SOAPS)

COCONUT OIL SHAMPOO BASE (see SHAMPOO BASE and POTASH SOAPS)

COCONUT OIL POWDERED SOAP (see POWDERED SOAPS)

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Consolidated Fruit Jar Co., New Brunswick, N. J.
Continental Can Co., 100 E. 42nd St., N. Y.
Globe Collapsible Tube Corp., 28 Columbia Heights, Brooklyn, N. Y.
Hygienic Tube Co., 34 Ave. L., Newark, N. J. (Celluloid)
National Collapsible Tube Co., Providence, R. I.
New England Collapsible Tube Co., New London, Conn.
Peerless Tube Co., Bloomfield, N. J.
Sun Tube Corp., Hillside, N. J.
Victor Metal Products Corp., Brooklyn, N. Y.
White Metal Mfg. Co., 1012 Grand St., Hoboken, N. J.
A. H. Wirz, Inc., Chester, Pa.

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Consolidated Products Co., 15 Park Row, N. Y. (Used)
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Manton-Gaulin Mfg., 19 Charlton St., Everett, Mass.
Pfaudler Co., Rochester, N. Y.
Travis Colloid Research Co., 119 Broad St., N. Y.
U. S. Colloid Mill Corp., 13th St. & East Ave., L. I. City, N. Y.

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Fezandie & Sperrle, 205 Fulton St., New York
Interstate Color Co., 5 Beekman St., New York
H. Kohnstamm & Co., 91 Park Place, New York
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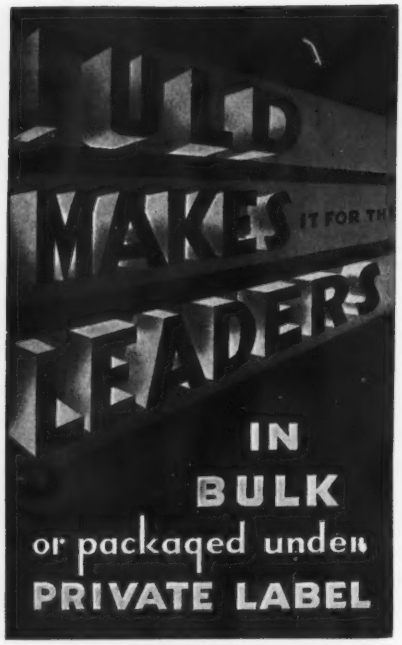

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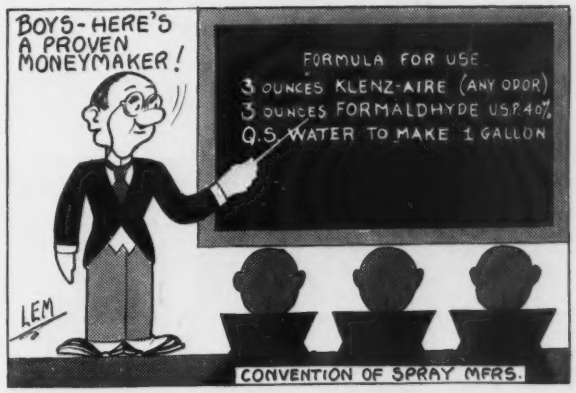
Columbia Soap & Chem. Co., Inc., 324 Leavenworth St., San Francisco
Crystal Labs., Inc., 21 W. Park Way, N. E., Pittsburgh, Pa.
Crystal Soap & Chem. Co., 6300 State Rd., Phila.
Davies-Young Soap Co., Dayton, O.
Delta Chemical Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Elkay Products Corp., 323 W. 16th St., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Goulard & Olena, 140 Liberty St., N. Y.
Higley Chemical Co., Dubuque, Iowa
Hockwald Chemical Co., 135 Mississippi St., San Francisco
Hubman Supply Co., 225 N. 4th St., Columbus, O.
Industrial Labs., 17-19 W. Conway St., Baltimore
Jansen Soap & Chemical Co., 324 Leavenworth St., San Francisco, Cal.
Kemiko Mfg. Co., 500 Chancellor Ave., Irvington, N. J.
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Moore Bros. Co., 67 Vestry St., N. Y.
Morgan Chemical Co., Harrisburg, Pa.
North Coast Soap & Chem. Wks., Seattle, Wash.
Palmer Products Inc., Waukesha, Wis.
Puritan Chemical Co., Atlanta, Ga.
Reliable Chemical Co., P. O. Box 361, Passaic, N. J.
Theo. B. Robertson Prods., Co., 700 W. Division St., Chicago
Rochester Germicide Co., Rochester, N. Y.
Rochester Sanitary Prods. Co., 874 Seward St., Rochester, N. Y.
Selig Co., 336 Marietta St., Atlanta, Ga.
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
Trojan Products & Mfg. Co., 3107 S. Wabash Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore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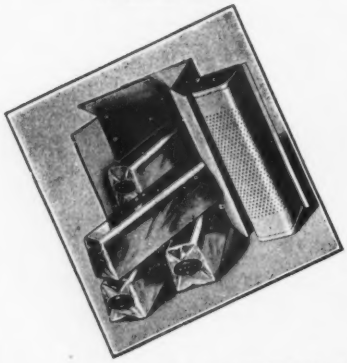

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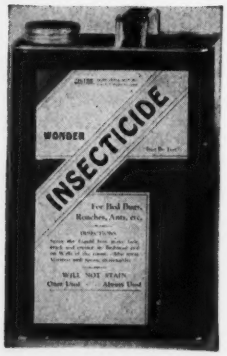

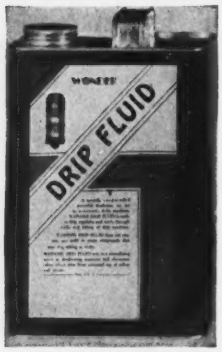

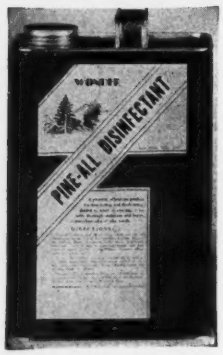

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White Tar Co., Kearny, N. J.

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American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y.
American Soap & Washoline Co., Cohoes, N. Y.
Antiseptol Co., 5524 Northwest Highway, Chicago
Armour & Co., 1355 W. 31st St., Chicago
Baum's Castorine Co., Rome, N. Y.
Blockson Chemical Co., Joliet, Ill.
Calgon, Inc., Pittsburgh
Candy & Co., 2515 W. 35th St., Chicago
Chemical Mfg. & Dist. Co., Easton, Pa.
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Cowles Detergent Co., 7016 Euclid Ave., Cleveland
Delta Chem. Co., 4 Payson Ave., N. Y.
Diamond Alkali Co., Standard Silicate Div., 535 Smithfield St., Pittsburgh
DuBois Soap Co., Cincinnati
E. I. DuPont de Nemours & Co., Wilmington, Dela.
Economics Laboratory, Globe Bldg., St. Paul
Fuld Bros., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Hercules Powder Co., Wilmington, Dela.
Higley Chemical Co., Dubuque, Iowa
A. R. Maas Chem. Co., South Gate, Calif.
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Midway Chemical Co., 5235 W. 65th St., Chicago
Monsanto Chemical Co., 1724 S. 2nd St., St. Louis
Napthole, Inc., 15 E. 26th St., New York
National Oil Prods. Co., Harrison, N. J.
Paper Makers Chem. Div., Hercules Powder Co., Wilmington, Del.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Philadelphia Quartz Co., S. 3rd St., Philadelphia
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
Port Huron Detergent Co., Port Huron, Mich.
Procter & Gamble Co., Cincinnati, O.
Sandoz Chem. Works, 61 Van Dam St., N. Y.
Stevens Soap Corp., 200 Sullivan St., Brooklyn, N. Y.
Theo B. Robertson Prods. Co., 700 W. Division St., Chicago
E. M. Sergeant Pulp & Chem. Co., 350 Fifth Ave., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Jos. Turner & Co., Ridgefield, N. J.
U. S. Sanitary Spec. Corp., 435 S. Western Ave., Chicago
Warner Chemical Co., 405 Lexington Ave., N. Y.
Wyandotte Chemical Co., Wyandotte, Mich.

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American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Chemical Mfg. & Dist. Co., Easton, Pa.
Colgate-Palmolive-Peet Co., Jersey City, N. J.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Fuld Bros., 702 S. Wolfe St., Baltimore
General Drug Co., 644 Pacific St., Bklyn.
General Dyestuff Corp., 435 Hudson St., N. Y.
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Higley Chemical Co., Dubuque, Iowa
Lever Bros. Co., Cambridge, Mass.
Michel Export Co., 90 Broad St., N. Y.
Monsanto Chemical Co., St. Louis
National Aniline & Chem. Co., 40 Rector St., N. Y.
Peck's Prods. Co., St. Louis
Procter & Gamble Co., Cincinnati, O.

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E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
General Dyestuff Corp., 435 Hudson St., N. Y.
Michel Export Co., Inc., 90 Broad St., N. Y.
National Aniline & Chemical Co., 40 Rector St., N. Y.
National Oil Prods. Co., Harrison, N. J.
L. Sonneborn Sons, 88 Lexington Ave., N. Y.
Wecoline Products, Inc., 15 E. 26th St., New York
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

DIES (see SOAP DIES)

DIETHANOLAMINE (see ETHANOLAMINE)

DIFFUSERS (Steam and Air)

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Fumeral Co., Racine, Wisc.
Mystic Products Co., 417 No. 5th St., Minneapolis

DIP OIL (see COAL TAR RAW MATERIALS)

DIPHENYL OXIDE (see AROMATIC CHEMICALS)

DISH WASHING COMPOUND DISPENSERS

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Wm. M. Britton Co., 6243 S. Manhattan, Los Angeles
Chemical Mfg. & Dist. Co., Easton, Pa.
Economics Laboratory, Inc., 622 Globe Bldg., St. Paul
Fuld Bros., 702 S. Wolfe St., Baltimore
Giant Products Co., 229 S. San Pedro St., Los Angeles
Mathieson Alkali Wks., 60 E. 42nd St., N. Y. (Cakes)
V. C. Products Co., Beury Bldg., Philadelphia (Powders)

DISH WASHING COMPOUNDS (see CLEANING COMPOUNDS)

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Ampion Corp., 4-88—47th Ave., Long Island City, N. Y.
Baird & McGuire, Inc., Holbrook, Mass.
Baird & McGuire, Inc. of Mo., St. Louis.
Chemical Compounding Corp., 262 Huron St., Brooklyn
Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14 37th Ave., Long Island City, N. Y.
Dow Chemical Co., Midland, Mich.
Eagle Soap Corp., Huntington, Ind.
Fuld Bros., 702 S. Wolfe St., Baltimore
Goulard & Olena, Inc., 140 Liberty St., N. Y.
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco Cal.
R. M. Hollingshead Corp., Camden, N. J.
Hooker Electrochemical Co., Niagara Falls, N. Y.
Hunt Mfg. Co., Lisbon Rd., Cleveland
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
McLaughlin Gormley King Co., Minneapolis, Minn.
Merck & Co., Rahway, N. J.
Monsanto Chemical Works, 1724 S. 2nd St., St. Louis
Niagara Alkali Co., 60 E. 42nd St., N. Y.
North Coast Soap & Chem. Works, Seattle, Wash.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Rochester Sanitary Prods. Co., 874 Seward St., Rochester, N. Y.
Sherwin-Williams Co., 601 Canal Rd., Cleveland
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CRESYLIC DISINFECTANTS: These disinfectants are recommended for hospital, surgical and veterinary use, meet Bureau of Standards Specifications, offered in phenol coefficients ranging from 4 to 6 F.D.A. Method of Test, form crystal clear solutions in ordinary tap water.

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Victory Chem. Co., 148 Fairmount Ave., Phila.

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Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
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Wm. Cooper & Nephews, 1909 Clifton Ave., Chicago
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Delta Chemical Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Elkay Products Corp., 323 W. 16th St., N. Y.
Empire Chem. Prods. Co., 12 Longworth Ave., Newark, N. J.
Fergusson Laboratories, Drexel Bldg., Phila.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Goulard & Olena, 140 Liberty St., N. Y.
Haag Laboratories, Inc., 6101 E. S. May St., Chicago
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Hockwald Chem. Co., 135 Mississippi St., San Francisco
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Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
McLaughlin Gormley King Co., 1715 Fifth St., S. E., Minneapolis, Minn.
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Midway Chemical Co , 5235 W. 65th St., Chicago
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J. A. Tumbler Labs., 423 Hanover St., Baltimore
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Delta Chem. Co., 4 Payson Ave., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
Hammond Paint & Chem. Co., Beacon, N. Y.
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Chemical Supply Co., 2450 Canal Rd., Cleveland
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Delta Chemical Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Goulard & Olena, Inc., 140 Liberty St., N. Y.
Haag Laboratories, 6101 S. May St., Chicago
Hercules Chem. Co., 332 Canal St., New York
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 30 Bluxome St., San Francisco
Hubman Supply Co., 225 N. 4th St., Columbus, O.
Hull Co., 305 Washington St., Brooklyn
Industrial Labs., 17-19 W. Conway St., Baltimore
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Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Mechling Bros. Chemical Co., Line St. & Cooper's Creek, Camden
Midway Chemical Co., 5235 W. 65th St., Chicago
North Coast Chem. & Soap Wks., Seattle, Wash.
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Rochester Germicide Co., Rochester, N. Y.
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
John Sunshine Chem. Co., 604 W. Lake St., Chicago
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
J. A. Tumbler Labs., 423 Hanover St., Baltimore
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago

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Fuld Bros., 702 S. Wolfe St., Baltimore
Garnet Chem. Corp., 911 N. Lumber St., Allentown, Pa.
Hockwald Chem. Co., 30 Bluxome St., San Francisco
Palmer Prods. Inc., Waukesha, Wis.
Rochester Germicide Co., 16 Downing Pl., Rochester, N. Y.
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Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago.

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DRUM WASHERS (see WASHING MACHINERY, DRUMS)

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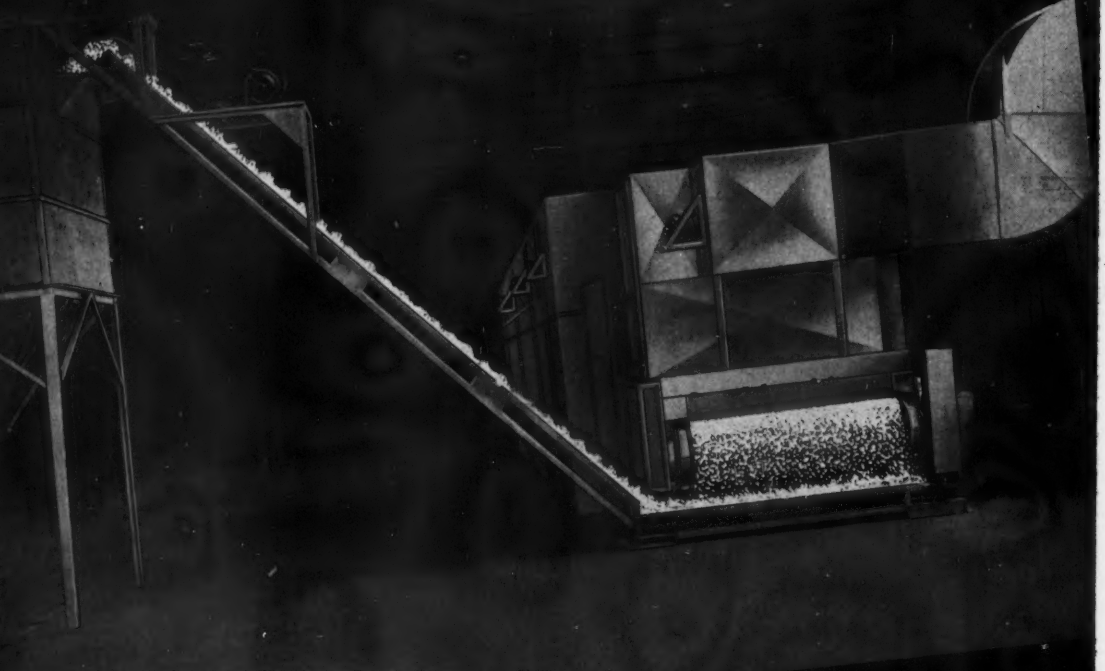

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Armour Soap Wks., 1355 W. 31st St., Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Beach Soap Co., Lawrence, Mass.
Clifton Chemical Co., 247 Front St., N. Y.
Davies-Young Soap Co., Dayton, O.
Eagle Soap Corp., Huntington, Ind.
J. Eavenson & Sons, Del & Penn Sts., Camden, N. J.
Fuld Bros., 702 S. Wolfe St., Baltimore
Harley Soap Co., Pierce and Orthodox Sts., Phila.
H. Kohnstamm & Co., 91 Park Pl., N. Y.
Midland Chem. Labs., Dubuque, Ia.
National Oil Products Co., Harrison, N. J.
North Coast Chem. & Soap Wks., Seattle, Wash.
Paper Makers Chem. Div., Hercules Powder Co., Wilmington, Del.
Puritan Soap Co., 573 Lyell Ave., Rochester, N. Y.
Richards Chem. Wks., Warren & Morris Sts., Jersey City, N. J.
Riverside Mfg. Co., 4919 Conn St., St. Louis
John T. Stanley Co., 642 W. 30th St., N. Y.
R. R. Street & Co., 561 W. Monroe St., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Ultra Chem. Wks., Inc., Kitay Bldg., Paterson, N. J.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
M. Werk Co., Cincinnati, O.

DRYERS, for Chip Soaps and Bars

Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259—46th St., Brooklyn
Proctor & Schwartz, 7th St. & Tabor Rd., Philadelphia
C. G. Sargent's Sons, Graniteville, Mass.

DRYING MACHINERY (General)

C. O. Bartlett & Snow Co., Cleveland
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Buckeye Dryer Co., 131 W. Lake St., Chicago
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Buffalo Foundry & Machine Co., Buffalo, N. Y.
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Drying Systems, Inc., 1800 Foster Ave., Chicago
Ellis Dryer Co., Roosevelt Road & Talman Ave., Chicago
B. F. Gump Co., 431 S. Clinton St., Chicago
Houchin Machinery Co., Hawthorne, N. J.
Lancaster Iron Works, Lancaster, Pa.
Alan Porter Lee, 136 Liberty St., N. Y.
J. M. Lehmann Co., 248 W. Broadway, N. Y.
Louisville Drying Equipment Co., Louisville, Ky.
Oven Equipment Co., New Haven, Conn.
Philadelphia Drying Mach. Co., Philadelphia
Proctor & Schwartz, 7th St. & Tabor Rd., Philadelphia
C. G. Sargent's Sons Corp., Graniteville, Mass.
Ernest Scott & Co., Fall River, Mass.
F. J. Stokes Machine Co., Philadelphia, Pa.
Struthers-Wells Co., Warren, Pa.
B. F. Sturtevant Co., Hyde Park, Boston

DUST PANS

A. Kreamer, Inc., 307 Kent Ave., Brooklyn
F. H. Lawson Co., Cincinnati
Palmer Products, Inc., Waukesha, Wis.
White Mop Wringer Co., Fultonville, N. Y.

DUSTERS (for cleaning)

Hoag Duster Co., 200 Church St., N. Y.
Palmer Products, Inc., Waukesha, Wis.
Rubon Woodfinishing & Prods. Co., 500 W. 7th St., Kansas City, Mo.
P. R. Schuman Duster Co., 65 E. 53rd St., Brooklyn
Tu-way Products Co., 1423 Franklin St., Detroit
P. Wohl & Sons, 85 Bayard St., N. Y.

DUSTERS (for insecticides) See Bellows

EMULSIFYING AGENTS

American Chemical Paint Co., Ambler, Pa.
American Colloid Co., 363 W. Superior St., Chicago
Arabol Mfg. Co., 110 E. 42nd St., N. Y.
Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
Atlantic Refining Co., 260 S. Broad St., Philadelphia
Atlas Powder Co., Wilmington, Dela.
Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Emery Industries, Inc., 4300 Carew Tower, Cincinnati
General Drug Co., 644 Pacific St., Bklyn.
Glyco Products Co., 230 King St., Bklyn.
W. C. Hardesty Co., 41 E. 42nd St., N. Y.
Hercules Powder Co., Wilmington, Dela.
Hull Co., 305 Washington St., Brooklyn
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Kessler Chem. Corp., 239—11th Ave., N. Y.
National Oil Products Co., Harrison, N. J.
Natural Minerals Co., 108 W. 6th St., Los Angeles
Orbis Products Corp., 215 Pearl St., N. Y.
Petroleum Specialties, Inc., 570 Lexington Ave., N. Y.
Procter & Gamble Co., Ivorydale, O.
Pylam Products Co., 799 Greenwich St., N. Y.
Richards Chem. Works, Warren and Morris St., Jersey City, N. J.
Rohm & Haas Co., 222 W. Washington Sq., Phila.
Sandoz Chemical Works, Inc., 61 Van Dam St., N. Y.
L. Sonneborn Sons, 88 Lexington Ave., N. Y.
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Charles A. Wagner Co., 813 Callowhill St., Phila.
Jacques Wolfe & Co., Passaic, N. J.

EMULSIFYING EQUIPMENT (see HOMOGENIZERS, MIXING EQUIPMENT, ETC.)

ESSENTIAL OILS

Allondon-Bayonne Co., 11 Park Place, N. Y.
Van Ameringen-Haebler, Inc., 315—4th Ave., N. Y.
Aromatic Products, Inc., 15 E. 30th St., N. Y.
Arthur Bennett, Inc., 109 W. Hubbard St., Chicago
W. J. Bush & Co., 11 E. 38th St., N. Y.
Ph. Chaleyer, Inc., 160 E. 56th St., N. Y.
Antoine Chiris Co., 115 E. 23rd St., N. Y.
Compagnie Duval, 121 E. 24th St., N. Y.
Compagnie Parento, Inc., Croton-on-Hudson, N. Y.
Cox, Aspden & Fletcher, 39 Cortlandt St., N. Y.
Gerard J. Danco, Inc., 333—6th Ave., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
P. R. Dreyer Inc., 119 W. 19th St., N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago, Ill.
Felton Chemical Co., 603 Johnson Ave., Brooklyn
Firmenich & Co., 135 5th Ave., N. Y.
Florasynth Laboratories, 1513 Olmstead Ave., Bronx, N. Y.
Benj. French, Inc., 160—5th Ave., N. Y.
Fritzsche Brothers, Inc., 76 Ninth Ave., N. Y.
General Drug Co., 644 Pacific St., Bklyn.
Givaudan-Delawanna, Inc., 330 W. 42nd St., N. Y.
James B. Horner, Inc., 3 Platt St., N. Y.
Chas. L. Huisking & Co., 155 Varick St., N. Y.
L. J. Hymes, 122 W. 26th St., N. Y.
Lautier Fils, 158 W. 18th St., N. Y.
Leghorn Trading Co., 21 West St., N. Y.
Pierre Lemoine, Inc., 67 Cortlandt St., N. Y.
Geo. Lueders & Co., 427 Washington St., N. Y.
Magnus, Mabee & Reynard, 16 Desbrosses St., N. Y.
J. Mannheimer, 214 E. 21st St., N. Y.
A. Maschmeijer, Jr., 43 W. 16th St., N. Y.
Hijos de Francisco Navarro, 140 William St., N. Y.
Naugatuck Aromatics, 12 E. 22nd St., N. Y.
Neumann-Buslee & Wolfe, 224 W. Huron St., Chicago
Norda Essential Oil & Chem. Co., 601 W. 26th St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
Polak's Frutal Wks., Inc., 36-14 35th St., L. I. City, N. Y.
Polak & Schwarz, Inc., 667 Washington St., N. Y.

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Schimmel & Co., 601 W. 26th St., N. Y.
Edwin Seebach Co., 912 Broadway, N. Y.
Wm. G. Sibbach & Co., 201 S. 2nd Ave., Maywood, Ill.
Synfleur Scientific Labs., Monticello, N. Y.
A. M. Todd Co., Kalamazoo, Mich.
Tombarel Products Corp., 9 E. 19th St., New York.
Ungerer & Co., 13 W. 20th St., N. Y.
Albert Verley, Inc., 1621 Carroll Ave., Chicago

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Mallinckrodt Chem. Wks., 3600 N. 2nd St., St. Louis
Merck & Co., Rahway, N. J. (also Petroleum)
Skelly Oil Co., Skelly Bldg., Kansas City
U. S. Industrial Chem. Co., 60 E. 42nd St., N. Y.

ETHYLENE DICHLORIDE (see SOLVENTS, ORGANIC)

EUCALYPTUS OIL (see ESSENTIAL OILS)

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Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Buffalo Fndry. & Mach. Co., Buffalo, N. Y.
Chemical Equipment Co., Montpelier, Ind.
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Edge Moor Iron Wks., 30 Rockefeller Plaza, N. Y.
William Garrigue & Co., 9 S. Clinton St., Chicago
Houchin Machy. Co., Hawthorne, N. J.
Lancaster Iron Works, Lancaster, Pa.
Alan Porter Lee, Inc., 136 Liberty St., N. Y.
Pfaudler Co., Rochester, N. Y.
Ernest Scott & Co., Fall River, Mass.
F. J. Stokes Machine Co., Phila., Pa.
Struthers-Wells Titusville Corp., Warren, Pa.
Swenson Evaporating Co., Harvey, Ill.
Wurster & Sanger, 5201 Kenwood Ave., Chicago
Zaremba Co., 560 Crosby Bldg., Buffalo, N. Y.

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Buffalo Forge Co., 490 Broadway, Buffalo
Duriron Co., Dayton, O.
Garden City Fan Co., McCormick Bldg., Chicago
General Regulator Corp., 2608 Arthington St., Chicago
Graybar Electric Co., 180 Varick St., N. Y.

FAT SPLITTING REAGENTS

Atlantic Refining Co., 260 S. Broad St., Philadelphia
Emery Industries, Inc., Carew Tower, Cincinnati
W. C. Hardesty Co., 41 E. 42nd St., N. Y.
Petroleum Specialties, Inc., 570 Lexington Ave., N. Y.
Sherwood Petroleum Co., 1 West Forest Ave., Englewood, N. J.
L. Sonneborn Sons, 88 Lexington Ave., N. Y.
Standard Oil Co., (Ind.) 910 S. Michigan Ave., Chicago

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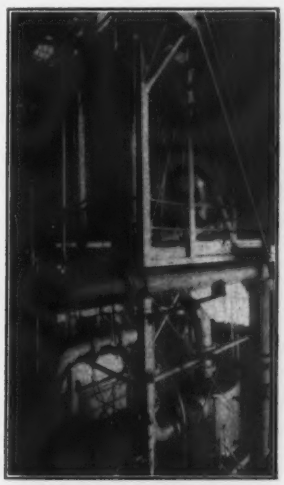

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(see also Brokers and Dealers)

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T. G. Cooper & Co., 47 N. 2nd St., Phila.
Darling & Co., 4201 So. Ashland Ave., Chicago
Durkee Famous Foods, Inc., 2670 Elston Ave., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
Emery Industries, Inc., 4300 Carew Tower, Cincinnati
A. Gross & Co., 122 E. 42nd St., N. Y.
Otto A. C. Hagen Co., 929 Public Ledger Bldg., Phila.
W. C. Hardesty Co., 41 E. 42nd Street, N. Y.
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Spencer Kellogg & Sons, Buffalo, N. Y.
Los Angeles Soap Co., Los Angeles, Calif.
N. I. Malmstrom & Co., 147 Lombardy St., Brooklyn
National Oil Products Co., Harrison, N. J.
Procter & Gamble Co., Cincinnati, O.
J. H. Redding, Inc., 17 Battery Place, N. Y.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.
Silmo Chemical Co., Vineland, N. J.
C. F. Simonin's Sons, Tioga & Belgrade St., Phila.
Werner G. Smith Co., 2191 W. 110th St., Cleveland
Southern Cotton Oil Co., Produce Exchange, N. Y.
A. E. Starkie Co., 528 N. Cuyler Ave., Oak Park, Ill.
Swift & Co., Union Stock Yards, Chicago
Theobald Industries, Kearny, N. J.
Arthur C. Trask Co., 4103 S. La Salle St., Chicago
Twitchell Process Co., Ivorydale, Ohio
Wecoline Products, Inc., 15 E. 26th St., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.
M. Werk Co., St. Bernard, Cincinnati
Wilson-Martin Co., Swanson St., Phila.
Woburn Degreasing Co., 1200 Harrison Ave., Harrison, N. J.

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E. I. du Pont de Nemours & Co., Wilmington, Del.
N. I. Malmstrom & Co., 147 Lombardy St., Bklyn., N. Y.
Michel Export Co., 90 Broad St., N. Y.
National Oil Prods. Co., Harrison, N. J.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland

FATTY ALCOHOLS, Sulfonated, See SULFONATED FATTY ALCOHOLS

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FIBRE CANS (see CANS, FIBRE)

FILLERS (see TALC, BENTONITE, CLAYS, ETC.)

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B. F. Gump Co., 431 S. Clinton St., Chicago (Bbls & Bags)
S. Howes Co., Silver Creek, N. Y. (Bbls.)
Johnson Automatic Sealer Co., Ltd., Battle Creek, Mich.
Pneumatic Scale Corp., Norfolk Downs, Mass.
Sprout, Waldron & Co., Muncy, Pa.
Stokes & Smith Co., 4915 Summerdale Ave., Philadelphia
Triangle Package Machinery Co., 906 N. Spaulding Ave., Chicago
Weigh Right Automatic Scale Co., 404 Grant Ave., Joliet, Ill.

FILLING MACHINERY (Liquids, Bottles)

Alsop Engineering Corp., 100 High St., Milldale, Conn.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Clevon Products Co., 27-31 Mechanic St., Buffalo
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Ertel Engineering Corp., Kingston, N. Y.
Filter Paper Co., 57 E. 24th St., Chicago
Horix Mfg. Co., Pittsburgh
Karl Kiefer Machine Co., 919 Martin St., Cincinnati
Pfaudler Co., Rochester, N. Y.
Pneumatic Scale Corp., Norfolk Downs, Mass.
Scientific Filter Co., 1 Franklin Sq., N. Y.
U. S. Bottlers Machinery Co., 4025 N. Rockwell St., Chicago
Vol-U-Meter Co., 707 Ohio St., Buffalo

FILLING MACHINERY (Liquids, Cans)

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S. F. Bowser & Co., 1302 E. Creighton Ave., Ft. Wayne, Ind.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Clevon Products Co., 27-31 Mechanic St., Buffalo
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Filter Paper Co., 57 E. 24th St., Chicago
Horix Mfg. Co., Pittsburgh
Karl Kiefer Machine Co., 919 Martin St., Cincinnati
Pfaudler Co., Rochester, N. Y.
Pneumatic Scale Corp., Norfolk Downs, Mass.
Scientific Filter Co., 1 Franklin Sq., N. Y.
F. J. Stokes Machine Co., 5918 Tabor Rd., Philadelphia
U. S. Bottlers Machinery Co., 4025 N. Rockwell St., Chicago
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Clevon Products Co., 27-31 Mechanic St., Buffalo
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
National Acme Co., E. 131st St., & Coit Ave., Cleveland
Scientific Filter Co., 1 Franklin Sq., N. Y.
The Vol-U-Meter Co., 707 Ohio St., Buffalo, N. Y.

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Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Clevon Products Co., 27-31 Mechanic St., Buffalo
Consolidated Prods. Co., 15 Park Row, N. Y. Used
J. L. Ferguson Co., Joliet, Ill.
Filler Machine Co., 1250 E. Montgomery St., Philadelphia
Karl Kiefer Machine Co., 919 Martin St., Cincinnati
Pfaudler Co., Rochester, N. Y.
Progressive Eng. Co., Torresdale, Pa.
Scientific Filter Co., 1 Franklin Sq., N. Y.
C. T. Small Mfg. Co., 1204 Ferguson Ave., St. Louis, Mo.
Sprague-Sells Corp., 308 W. Washington St., Chicago
Stokes & Smith Co., 4915 Summerdale Ave., Phila.
F. J. Stokes Machine Co., 5918 Tabor Rd., Philadelphia
Triangle Package Machy. Co., 910 N. Spaulding Ave., Chicago
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Brill Equipment Corp., 183 Varick St., N. Y. (Used)
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Arthur Colton Co., Detroit, Mich.
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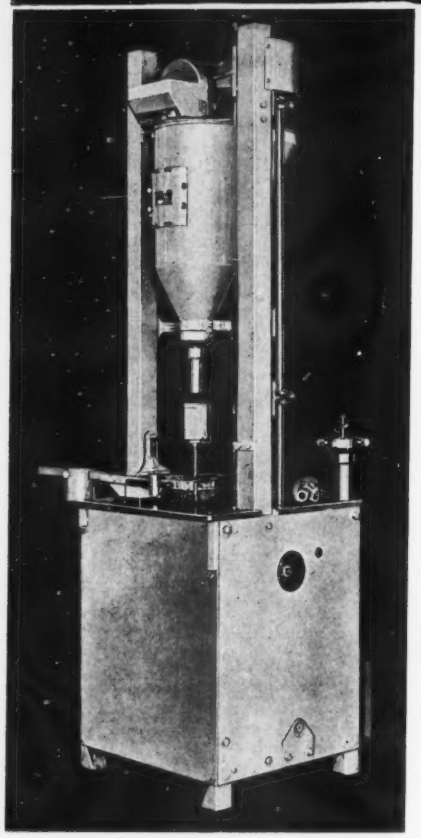

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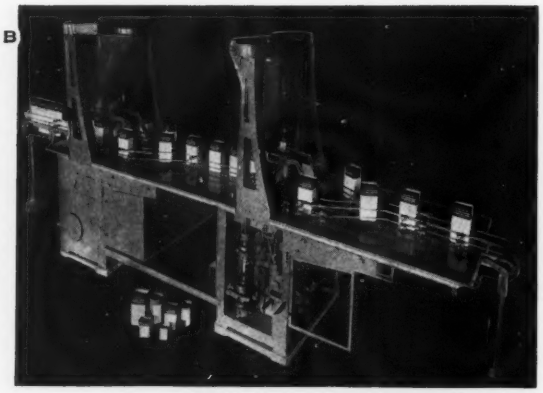

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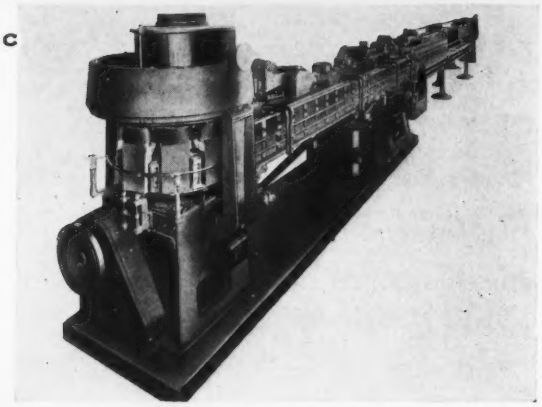

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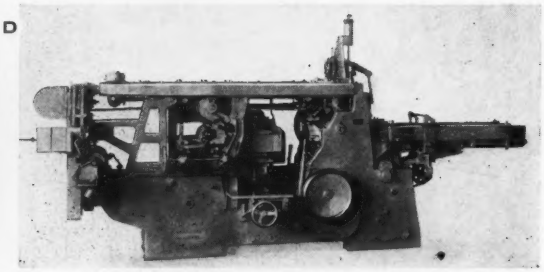

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15-20 Per Min.

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Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Package Machinery Corp., 1400 West Ave., Buffalo, N. Y.
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
J. L. Ferguson Co., Joliet, Ill.
B. F. Gump Co., 431 S. Clinton St., Chicago
S Howes Co., Silver Creek, N. Y. (Bbls.)
Johnson Automatic Sealer Co., Battle Creek, Mich.
Modern Packaging Machy. Co., Danville, Ill.
Pneumatic Scale Corp., Norfolk Downs, Mass.
F. B. Redington Co., 112 S. Sangamon St., Chicago
Stokes & Smith Co., 4915 Summerdale Ave., Phila.
Sprout, Waldron & Co., Muncy, Pa.
F. J. Stokes Mach. Co., 5918 Tabor Rd., Philadelphia
Triangle Package Machinery Co., 906 N. Spaulding Ave., Chicago
Weigh Right Automatic Scale Co., Joliet, Ill.

FILTER AIDS

Amer. Cyanamid & Chem. Corp., Rockefeller Plaza, N. Y.
Johns Manville, 22 E. 40th St., N. Y.
Dicalite Co., 120 Wall St., N. Y.
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Tamms Silica Co., 229 N. La Salle St., Chicago

FILTER CLAYS **(see CLAYS)**

FILTER CLOTHS

Abbott Associates, 417 Park Sq. Bldg., Boston
Alsop Engineering Corp., 100 High St., Milldale, Conn.
Cleveland Wire Cloth & Mfg. Co., 3574 E. 78th St., Cleveland
Filter Paper Co., 57 E. 24th St., Chicago
B. F. Gump Co., 431 S. Clinton St., Chicago
Wm. E. Hooper & Sons, Juniper & Cherry Sts., Philadelphia
Independent Filter Press Co., 189 Seventh St., Brooklyn
National Filter & Cloth Weaving Co., 220 E. 42nd St., N. Y.
Newark Wire Cloth Co., 223 Verona Ave., Newark, N. J.
Oliver United Filters, Inc., 33 W. 42nd St., N. Y.
J. T. Perkins Co., 669 Kent Ave., Brooklyn
Wm. R. Perrin & Co., 349 W. 23rd St., Chicago
T. Shriver & Co., Harrison, N. J.
D. R. Sperry & Co., Batavia, Ill.

FILTER PAPER

Alsop Engineering Corp., 100 High St., Milldale, Conn.
H. Reeve Angel & Co., 7 Spruce St., N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago, Ill.
Filter Paper Co., 57 E. 24th St., Chicago
General Chemical Co., 40 Rector St., N. Y.
August Giese & Son, 121 E. 24th St., N. Y.
Karl Kiefer Machine Co., Cincinnati, O.
Magnus, Mabee & Reynard, 16 Desbrosses St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
Palo Co., 81 Reade St., N. Y.
Scientific Filter Co., 1 Franklin Sq., N. Y.
T. Shriver & Co., Harrison, N. J.

FILTER PRESSES

Alsop Engineering Corp., 100 High St., Milldale, Conn.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Ertel Engineering Corp., Kingston, N. Y.
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A wax of the oil base type. Applied with a mop or applicator. Buffs and polishes beautifully. A superior product of its type.

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A superior lacquer developed particularly for use on rubber and rubber tile. Dries rapidly, easily applied and very durable. Will not discolor light shades.

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Specially made for printed, lacquer finished inlaid linoleum and congoleum or Sealex types of linoleum. Dries in 30 minutes, easy to apply and will not cause light, delicate shades to fade or discolor.

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A high lustre, self-polishing wax—made to enable you to meet price competition—compares most favorably when tested for brilliance, body, wearing qualities, washability and resistance to slip, with much higher priced products.

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Wm. R. Perrin & Co., 349 W. 23rd St., Chicago
Scientific Filter Co., 1 Franklin Sq., N. Y.
T. Shriver & Co., Harrison, N. J.
Sparkler Mfg. Co., 1207 W. Webster Ave., Chicago
D. R. Sperry & Co., Batavia, Ill.
United Filters Corp., Hazelton, Pa.

FILTERING MATERIALS (see also CLAYS, FILTER AIDS, and DECOLORIZING CARBON)

American Colloid Corp., 363 W. Superior St., Chicago
Dicalite Co., 120 Wall St., New York
Filtrol Corp., 315 W. 5th St., Los Angeles
Industrial Chem. Sales Div., West Va. Pulp and Paper Co., 230 Park Ave., New York
Innis-Speiden & Co., 117 Liberty St., New York
Johns-Manville Corp., 22 East 40th St., New York
Peerless Clay & Mineral Co., Pueblo, Colo.
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Wishnick-Tumpeer, Inc., 295 Madison Ave., New York

FILTERS (Special)

Alsop Engineering Corp., 100 High St., Milldale, Conn.
S. F. Bowser & Co., 1302 E. Creighton Ave., Ft. Wayne, Ind.
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Ertel Engineering Corp., Kingston, N. Y.
Filter Paper Co., 57 E. 24th St., Chicago
Foster Pump Wks., Inc., 54 Washington St., Brooklyn
Jacob House & Sons, 52 St. Paul St., Buffalo
Karl Kiefer Machine Co., 919 Martin St., Cincinnati
Lancaster Iron Works, Lancaster, Pa.
Mixing Equipment Co., 1067 Garson Ave., Rochester, N. Y.
Oliver United Filters, Inc., 33 W. 42nd St., N. Y.
Permutit Co., 330 W. 42nd St., N. Y.
Scientific Filter Co., 1 Franklin Sq., N. Y.
T. Shriver & Co., Harrison, N. J.
Sparkler Mfg. Co., 1207 W. Webster Ave., Chicago
U. S. Bottlers Machy. Co., 4015 N. Rockwell St., Chicago
Whiting Corp., Harvey, Ill.

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Fuld Bros., 702 S. Wolfe St., Baltimore
Glyco Products Co., 230 King St., Bklyn.
Monsanto Chemical Co., 1724 South Second St., St. Louis
Niacet Chemicals Corp., Niagara Falls, N. Y.
Price Fire & Water Proofing Co., Poughkeepsie, N. Y.
Protexol Corp., 32 Market St., Kenilworth, N. J.
Victor Chemical Works, 141 West Jackson Bldg., Chicago

FISH OILS
(see also Brokers and Dealers)

Atlantic Products Corp., Commercial Trust Bldg., Phila.
Atlas Refinery, Lockwood St., Newark, N. J.
Falk & Co., Pittsburgh
Hooker Electrochemical Co., Niagara Falls, N. Y.
Murray Oil Products Co., 21 West St., N. Y.
National Oil Prods. Co., Harrison, N. J.
Pacific Vegetable Oil Co., 62 Townsend St., San Francisco
J. H. Redding, Inc., 17 Battery Place, N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Swan Finch Oil Corp., 30 Rockefeller Plaza, N. Y.
Arthur C. Trask Co., 4103 S. La Salle St., Chicago

FISH OIL SOAPS

Crystal Soap & Chem. Co., 6300 State Rd., Phila.
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Hockwald Chem. Co., 135 Mississippi St., San Francisco
National Oil Products Co., Harrison, N. J.
Newell Gutradt Co., 350 Fremont St., San Francisco, Cal.
North Coast Chem. & Soap Works, Seattle, Wash.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Silmo Chemical Co., Vineland, N. J.
Werner G. Smith Co., 2191 W. 110th St., Cleveland

FIXATIVES, PERFUME (See ESSENTIAL OILS)

FLAKE SOAPS (see CHIP SOAPS)

FLOATING SOAPS

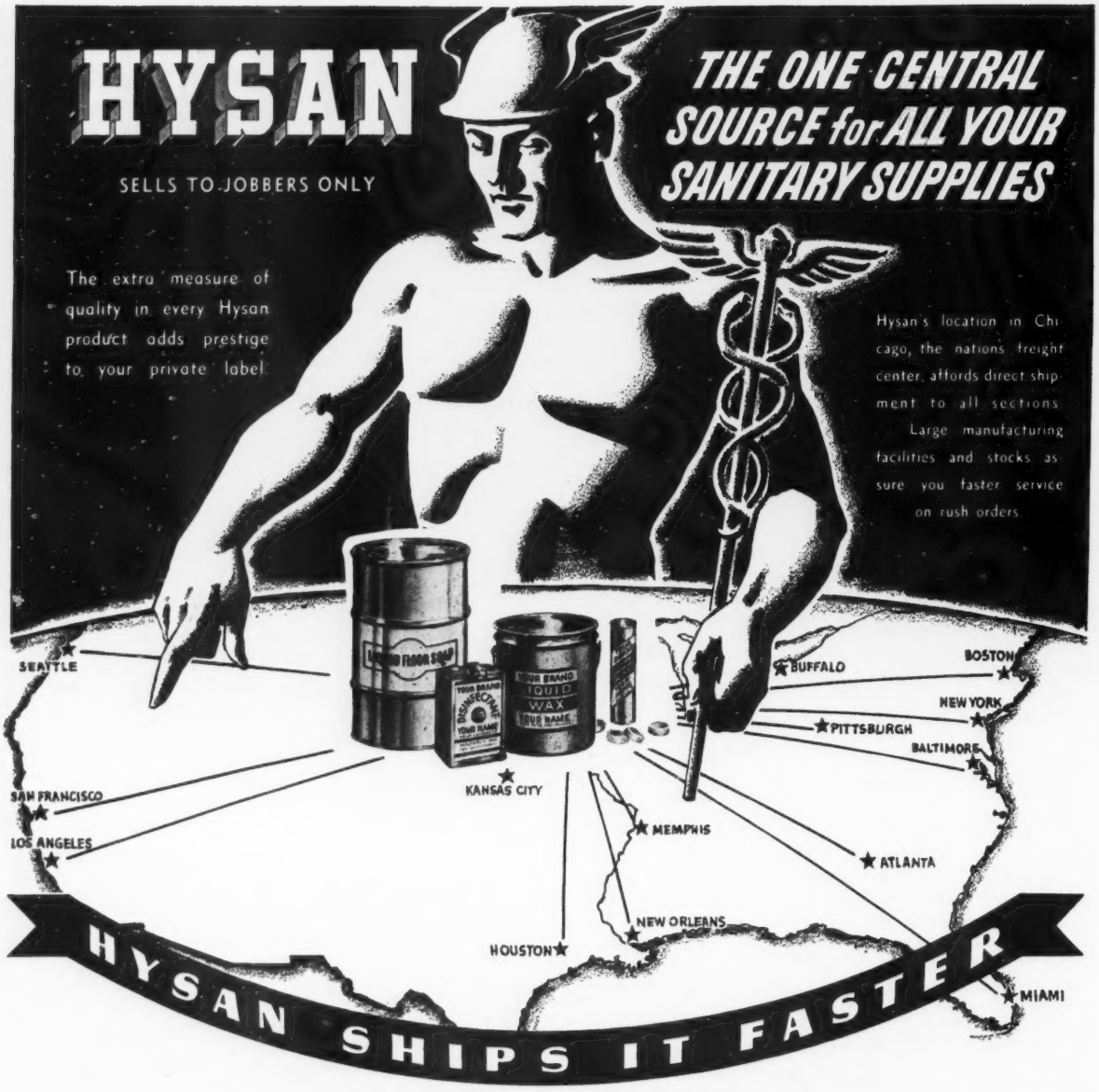
Armour & Co., 1355 W. 31st St., Chicago
Beach Soap Co., Lawrence, Mass.
Colgate-Palmolive-Peet Co., Jersey City, N. J.
Cudahy Packing Co., 221 N. La Salle St., Chicago
J. Eavenson & Sons, Camden, N. J.
Hewitt Soap Co., Dayton, Ohio
Iowa Soap Co., Burlington, Iowa
Lightfoot Schultz Co., 663 Fifth Ave., N. Y.
Procter & Gamble Co., Cincinnati
Geo. A. Schmidt & Co., 236 W. North Ave., Chicago
John T. Stanley Co., 642 W. 30th St., N. Y.
M. Werk Co., Cincinnati, O.
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

FLOOR FINISHES (Non-Wax)

Ampion Corp., 4-88—47th Ave., Long Island City, N. Y.
Candy & Co., 2515 W. 35th St., Chicago
Chemical Compounding Corp., 262 Huron St., Bklyn.
Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
Davies-Young Soap Co., Dayton, O.
Duke Paint & Varnish Co., 317—37th St., Brooklyn
Delta Chem. Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Federal Varnish Co., 337 S. Peoria St., Chicago
Franklin Research Co., 5134 Lancaster Ave., Phila.
Fuld Bros., 702 S. Wolfe St., Baltimore
Higley Chemical Co., Dubuque, Iowa
Hockwald Chemical Co., 135 Mississippi St., San Francisco
La Maison Prods., Inc., 80 York St., Brooklyn
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Palmer Products, Inc., Waukesha, Wis.
Peck's Products Co., St. Louis
Theo. B. Robertson Prods. Co., 700 W. Division St , Chicago
S. S. Stafford, Inc., 603 Washington St., N. Y.
Standard Oil Co. (Calif.), 225 Bush St., San Francisco
Standard Oil Co. (Ind.), 910 S. Michigan Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
U. S. Sanitary Spec. Corp., 435 S. Western Ave., Chicago
Victory Chem. Co., 148 Fairmount Ave., Phila.
T. F. Washburn Co., 2244 Elston Ave., Chicago

FLOOR MACHINES

Adams Prods., Inc., 248 W. Fairfield Ave., St. Paul
Amer. Floor Surfacing Mach. Co., Toledo, O.
Continental Car-Na-Var Corp., Brazil, Ind.
Electric Sprayit Co., Sheboygan, Wisc.
Fay Co., 130 Madison Ave., N. Y.
Finnell System, Inc., Elkhart, Ind.
General Floor Craft Corp., 333 Sixth Ave., N. Y.
Hild Floor Machine Co., 1313 W. Randolph St., Chicago
Kent Co., Rome, N. Y.
S. C. Lawlor Co., 122 N. Aberdeen St., Chicago
Lincoln-Schlueter Floor Machy. Co., 220 W. Grand Ave., Chicago
Ponsell Floor Machine Co., 220 W. 19th St., N. Y.



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Churchill Mfg. Co., Galesburg, Ill.
A. F. Dormeyer Mfg. Co., 2640 Greenwich Ave., Chicago
Greenview Mfg. Co., 2557 Greenview Ave., Chicago
Lincoln-Schlueter Floor Machy. Co., 220 W. Grand Ave., Chicago
Palmer Products, Inc., Waukesha, Wis.
White Mop Wringer Co., Fultonville, N. Y.

FLOOR SCRUB SOAPS (see also Potash Soaps)

Allied Consolidated Industries, Trenton, N. J.
American Soap & Washoline Co., Cohoes, N. Y.
Ampion Corp., 4-88—47th Ave., Long Island City, N. Y.
Antiseptol Co., 5524 Northwest Highway, Chicago
Armour & Co., 1355 W. 31st St., Chicago
Baum's Castorine Co., Rome, N. Y.
Candy & Co., 2515 W. 35th St., Chicago
Chemical Compounding Corp., 262 Huron St., Brooklyn
Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Road, Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
Crystal Soap & Chem. Co., 6300 State Rd., Phila.
Churchill Mfg. Co., Galesburg, Ill.
Davies-Young Soap Co., Dayton, O.
Delta Chem. Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Empire Chem. Prods. Co., 12 Longworth Ave., Newark, N. J.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Haag Laboratories, 6101 S. May St., Chicago
Harley Soap Co., Pierce & Orthodox Sts., Philadelphia
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Hubman Supply Co., 225 N. 4th St., Columbus, O.
Kranich Soap So., 60 Richards St., Brooklyn
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Morgan Chemical Co., Harrisburg, Pa.
Paper Makers Chem. Div., Hercules Powder Co., Wilmington, Del.
Procter & Gamble Co., Cincinnati
Puritan Soap Co., 573 Lyell Ave., Rochester, N. Y.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Rochester Germicide Co., Rochester, N. Y.
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
S. S. Stafford, Inc., 603 Washington St., N. Y.
John T. Stanley Co., 642 W. 30th St., N. Y.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
Thompson-Hayward Chem. Co., 2915 Southwest Blvd., Kansas City, Mo.
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Twi-Laq Chemical Co., N. Portland Ave., Bklyn.
Uncle Sam Chemical Co., 329 E. 29th St., N. Y.
U. S. Sanitary Spec. Corp., 435 S. Western Ave., Chicago

FLOOR WAXES

Allied Consolidated Industries, Trenton, N. J.
American Wax Co., 13-26 128th St., College Point, L. I.
Ampion Corp., 4-88—47th Ave., Long Island City, N. Y.
Antiseptol Co., 5524 Northwest Highway, Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Buckingham Wax Corp., Van Dam St., & Borden Ave., L. I. City, N. Y.
Candy & Co., 2515 W. 35th St., Chicago
Chemical Compounding Corp., 262 Huron St., Brooklyn.
Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
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CLEANER . . . is a smooth uniform material, similar in texture to cold cream, which easily adheres to cloth or pad and readily adapts itself to the surface to be cleaned. It will not "ball up" after cleaner has been spread out . . . nor "run away" from cloth, sponge or cleaning pad. To insure quick action without scratching, the abrasive in Candy's Bright Beauty Paste Cleaner is carefully graded. Coarser particles are eliminated without increasing the percentage of super-fine inactive particles appreciably. Made for all around use on practically all types of surfaces, such as: glass, steel, composition, nickel, copper, brass, enamel, painted wall, terrazzo, aluminum, linoleum, marble, tile, etc.

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Makers of Paste Wax, Spirit Liquid Waxes, Powdered Dance Floor Wax, Concentrated Cream Furniture Polish, Paste Cleaners

FLOOR WAXES (Contd.)

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Dri-Brite, Inc., 4443 Cook Ave., St. Louis
Duke Paint & Varnish Co., 317—37th St., Brooklyn
Economics Laboratory, St. Paul
Federal Varnish Co., 337 S. Peoria St., Chicago
Fox Lake Chemical Co., Fox Lake, Ill.
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Franklin Research Co., 5134 Lancaster Ave., Philadelphia
Fuld Bros., 702 S. Wolfe St., Baltimore
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
R. M. Hollingshead Corp., Camden, N. J.
Hubman Supply Co., 225 N. 4th St., Columbus, O.
Hunt Mfg. Co., Lisbon Rd., Cleveland
International Metal Polish Co., Twill St. & Belt Ry., Indianapolis
La Maison Prods., Inc., 80 York St., Brooklyn
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
M. & H. Laboratories, 2703 Archer Ave., Chicago
Palmer Products, Inc., Waukesha, Wis.
Paper Makers Chem. Div., Hercules Powder Co., Wilmington, Del.
Perrow Chemical Co., Hunt, Va.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Shawmut Specialty Co., 311 Centre St., Jamaica Plains, Mass.
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
S. S. Stafford, Inc., 603 Washington St., N. Y.
Standard Oil Co. (Calif.), 225 Bush St., San Francisco
Standard Oil Co. (Ind.), 910 S. Michigan Ave., Chicago
H. F. Staples Co., Medford, Mass.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Twi-Laq Chemical Co., 25 N. Portland Ave. Brooklyn
Twin City Shellac Co., 340 Flushing Ave., Brooklyn
Uncle Sam Chemical Co., 329 E. 29th St., N. Y.
U. S. Sanitary Specialties Corp., 435 Western Ave., Chicago
Victory Chem. Co., 148 Fairmount Ave., Phila.
T. F. Washburn Co., 2244 Elston Ave., Chicago
Windsor Wax Co., Inc., 53 Park Pl., N. Y.

FLOTATION OILS

Armour & Co., 1355 W. 31st St., Chicago
Barrett Co., 40 Rector St., N. Y.
Carbide & Carbon Chemicals Corp., **30 E. 42nd St., N. Y.**
Cliffs Dow Chemical Co., Marquette, Mich.
Crosby Naval Stores, Picayune, Miss.
General Naval Stores Co., 230 Park Ave., N. Y.
Glidden Co., Naval Stores Div., P. O. Box 389, Jacksonville, Fla.
Hardwood Chemical Co., 2 Jersey St., Buffalo, N. Y.
Hercules Powder Co., Wilmington
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Koppers Co., Koppers Bldg., Pittsburgh
National Aniline & Chemical Co., 40 Rector St., N. Y.
Pittsburgh Coal Carbonization Co., Oliver Bldg., Phila.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Republic Chemical Co., 94 Beekman St., N. Y.
Tennessee Eastman Corp., Kingsport, Tenn.

FLUORIDES
(see also Dealers)

Aluminum Co. of America, Gulf Bldg., Pittsburgh
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
American Fluoride Corp., 151 W. 19th St., N. Y.
Blockson Chemical Co., Joliet, Ill.
Foote Mineral Co., 1609 Summer St., Philadelphia
General Chemical Co., 40 Rector St., N. Y.
Harshaw Chemical Co., 1945 97th St., Cleveland
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Lindsay Light & Chem. Co., West Chicago, Ill.
Merck & Co., Rahway, N. J.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Pfaltz & Bauer, 350 Fifth Ave., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.

FLY SPRAYS (see HOUSEHOLD INSECTICIDE SPRAYS)

FOAMING AGENTS (see SAPONIN)

FOOT BATHS (Rubber)

U. S. Rubber Co., Market & South Sts., Passaic, N. J.

FORMALDEHYDE
(see also Brokers and Dealers)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Cliffs-Dow Chem. Co., Marquette, Mich.
Delta Chem. & Iron Co., Wells, Mich.
E. I. du Pont de Nemours & Co., Wilmington, Del.
Wm. S. Gray Co., 342 Madison Ave., N. Y.
Hercules Powder Co., Wilmington, Del.
Heyden Chem. Co., 50 Union Sq., N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Mallinckrodt Chemical Work, St. Louis, Mo.
Merck & Co., Rahway, N. J.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Jos. Turner & Co., 630 Fifth Ave., N. Y.

FORMALDEHYDE CANDLES

American Fluoride Corp., 151 W. 19th St., N. Y.
Bauer & Black, Chicago
Cenol Co., 4250 N. Crawford Ave., Chicago
Depree Chem., Holland, Mich.

FRAMES (Soap)

Brill Equipment Corp., 133 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259 49th St., Brooklyn
Littleford Bros., 451 E. Pearl St., Cincinnati
Newman Tallow & Soap Mach. Co., 1051 W. 35th St., Chicago

FULLERS EARTH

American Colloid Co., 363 W. Superior St., Chicago
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Attapulgus Clay Co., 260 So. Broad St., Phila.
Chas. B. Chrystal Co., 11 Park Pl., N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago
Filtrol Corp., 315 W. 5th St., Los Angeles
Fullers Earth Co., 2049 E. 100th St., Cleveland
Hammill & Gillespie, 225 Broadway, N. Y.
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jas. H. Rhodes & Co., 157 W. Hubbard St., Chicago
L. A. Salomon & Bro., 216 Pearl St., N. Y.
Sinclair Refining Co., East Chicago, Ind.
Standard Oil Co. (Ind.), 910 S. Michigan Ave., Chicago
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Tamms Silica Co., 228 N. La Salle St., Chicago
United Clay Mines Corp., 101 Oakland St., Trenton, N. J.
Charles A. Wagner Co., 809 Callowhill St., Phila.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.
Whittaker, Clark & Daniels, 260 W. Broadway, N. Y.

FUMIGANTS (Cyanide, etc.)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
Dow Chemical Co., Midland, Mich.
E. I. du Pont de Nemours & Co., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Kay-Fries Chemicals, Inc., 180 Madison Ave., N. Y.
Mechling Bros. Chemical Co., Line St. & Cooper Creek, Camden, N. J.
Michigan Alkali Co., 60 E. 42nd St., N. Y.
Rohm & Haas Co., Inc., 222 W. Washington Sq., Philadelphia

WURSTER & SANGER, INC.

Contracting and Consulting Engineers

52nd STREET & S. KENWOOD AVENUE, CHICAGO, ILLINOIS

Specialists in the Soap, Glycerine, Fat and Oil Industries

Complete Plants and Engineering Services for:

Crude, Dynamite and C. P. Glycerine
Refining, Bleaching and Deodorizing Oils
Hydrogenation of Oils
Vegetable Shortening, Margarine
Salad Oil, Winter Oil
Evaporation in Single, Double and Multiple Effects
Fat Splitting: Eisenlohr Continuous Process
Twitchell and Autoclave Processes
Stearic Acid and Red Oil
Fatty Acid Distillation
Laundry and Toilet Soaps
Oil Extraction and Degreasing
Glue and Gelatine
Continuous Glue Evaporation

Development of Processes, Reports, Investigations

W & S GLYCERINE EVAPORATORS

The improved WURSTER & SANGER Soap Lye Evaporator constitutes a marked advance in calandria design. Positive circulation of liquor in a definite direction has proved to increase the rate of evaporation and promote the separation of large crystals.

The WURSTER & SANGER Sweet-Water Evaporator has fulfilled the long need of complete accessibility for cleaning of tubes. It is equipped with an external heating element which affords high liquid velocity and a high rate of heat transfer.

CONTINUOUS GLYCERINE REFINING

Our Continuous Glycerine Refining Plants represent the most modern and economical equipment for the production of Dynamite, High Gravity and C. P. grades from Crude. We have developed a plant which is an improvement over all former methods of distilling glycerine.

Our plants are producing C. P. glycerine in one distillation with yields of over 97% and low steam consumption. All glycerine is condensed in concentrated form eliminating the handling of sweet-waters. Continuous operation and automatic controls reduce the operating attention to a minimum.

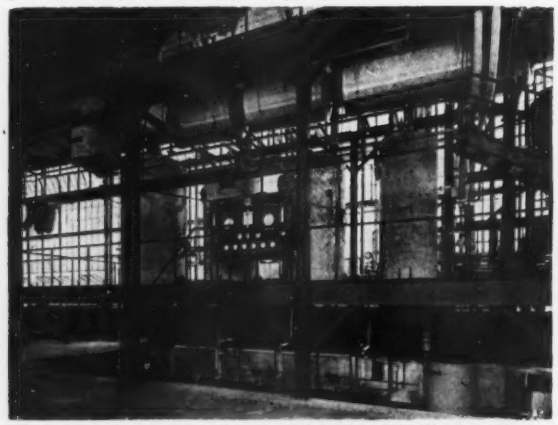
OIL REFINING AND DEODORIZING PLANTS

WURSTER & SANGER Oil Refining and Deodorizing Plants for the production of edible oils are suitable for cottonseed, corn, soya bean, peanut, cocoanut and other oils. Our equipment, processes and services cover completely all phases of this industry.

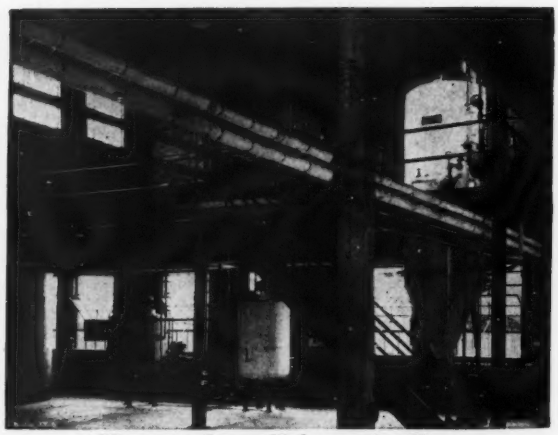
HYDROGENATION PLANTS

WURSTER & SANGER Oil Hardening Plants are built for partially or completely hardening vegetable oils, fish oils, lard and tallow, for edible and technical purposes.

Our plants are simple, efficient and economical in operation and give uniform products of highest quality.



Wurster & Sanger Continuous Glycerine Distillation Plant



Wurster & Sanger Hydrogenation Plant

W & S CATALYST REDUCER

The operation of the WURSTER & SANGER Wet Catalyst Reducer is completely automatic, resulting in a uniform catalyst of the greatest activity, longest life and less susceptible to poisons. The hazards encountered in dry reduction methods are eliminated. Operating costs are extremely low.

FATTY ACID DISTILLATION

WURSTER & SANGER Fatty Acid Distillation Plants are of improved design and construction throughout. Operation is under high vacuum and at low temperature, producing a superior quality of distilled fatty acids with high yields.

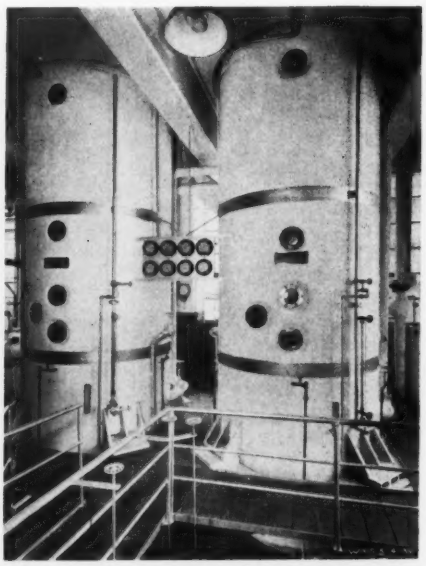
SOAP AND SOAP POWDER PLANTS

We specialize in the design and building of soap plants. Our Spray-Process Soap Powder Plant is producing soap powder at the lowest production cost.

ESTIMATES AND QUOTATIONS

We are glad to furnish information and quotations covering any equipment from the smallest part of an installation to complete plants for the manufacture of products from fats and oils.

Your inquiries will have our prompt consideration.



Wurster & Sanger Double Effect Soap Lye Glycerine Evaporator

GAS MASKS

Davis Emergency Equip. Co., 55 Van Dam St., N. Y.
Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa.

GAUGES (see INSTRUMENTS)

GERANIOL (see AROMATIC CHEMICALS)

GERANIUM OIL (see ESSENTIAL OILS)

GERANYL ACETATE (see AROMATIC CHEMICALS)

GIFT SETS (see NOVELTY SOAPS AND TOILET SOAPS)

GLASS BOTTLES and JARS (see BOTTLES)

GLASS and WINDSHIELD CLEANERS

An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Calif.
Buck-Jack Co., 3056 Federal St., Baltimore
Churchill Mfg. Co., So. Chambers & Knox Sts., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
Delta Chem. Co., 4 Payson Ave., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., Kensington, Philadelphia
Goulard & Olena, Inc., 140 Liberty St., N. Y.
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Hull Co., 305 Washington St., Brooklyn
Industrial Labs., 17-19 W. Conway St., Baltimore
Kemiko Mfg. Co., 500 Chancellor Ave., Irvington, N. J.
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
M. & H. Laboratories, 2703-5 Archer Ave., Chicago
National Oil Prods. Co., Harrison, N. J.
Palmer Products, Inc., Waukesha, Wis.
Shell Chemical Co., San Francisco
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
John Sunshine Chem. Co., 604 W. Lake St., Chicago
U. S. Sanitary Spec. Corp., 435 S. Western Ave., Chicago

GLUES (see ADHESIVES)

GLYCERINE (Refined)

Armour & Co., 1355 W. 31st St., Chicago
Century Stearic Acid Candle Wks., 22 E. 40th St., N. Y.
Colgate-Palmolive-Peet Co., Jersey City, N. J.
W. C. Hardesty Co., 41 E. 42nd St., N. Y.
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Lever Bros. Co., Cambridge, Mass.
Los Angeles Soap So., Los Angeles, Calif.
Leo Pasternak, 110 William St., N. Y. (Brokers)
Procter & Gamble Co., Cincinnati
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Swift & Co., Union Stock Yards, Chicago
Wecoline Products, Inc., 15 E. 26th St., N. Y.
M. Werk Co., St. Bernard, Cincinnati
Allen B. Wrisley Co., 6801 West 65th St., Chicago

GLYCERINE DISTILLATION PLANTS

E. B. Badger Co., 25 Pitts St., Boston
William Garrigue & Co., 9 S. Clinton St., Chicago
Alan Porter Lee, Inc., 136 Liberty St., N. Y
Ernest Scott & Co, Fall River, Mass.
Swenson Evaporator Co., Harvey, Ill.
Wurster & Sanger, 5201 S. Kenwood Ave., Chicago

GREASES

Armour & Co., 1355 W. 31st St., Chicago
Belleville Rendering Co., Belleville, Ill.
Consolidated Rendering Co., 178 Atlantic Ave., Boston
Cudahy Packing Co., 111 W. Monroe St., Chicago
Darling & Co., 4201 S. Ashland Ave., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
Otto A. C. Hagen Co., 929 Ledger Bldg., Philadelphia
Long Island Soap Co., Meeker Ave. & Bridgewater St., Brooklyn
N. I. Malmstrom & Co., 147 Lombardy St., Brooklyn
Procter & Gamble Co., Cincinnati
Willibald Schaefer Co., Foot of Bremen Ave., St. Louis
Werner G. Smith Co., 2191 W. 110th St., Cleveland
Standard Oil Co. (Ind.), 910 S. Michigan Ave., Chicago
Louis Stern Sons, Inc., Produce Exchange, N. Y.
Theobald Industries, Kearny, N. J.
Toledo Tallow Co., Toledo, Ohio
Waltham Tallow Co., Waltham, Mass.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.
Wilson & Co., Union Stock Yards, Chicago
Wilson-Martin Co., Swanson St., Philadelphia
Woburn Degreasing Co., 1200 Harrison Ave., Harrison, N. J.

GREEN SOAP (see POTASH SOAP)

GRINDING MACHINERY (for milling, pulverizing, etc.)

Abbe Engineering Co., 50 Church St., N. Y.
American Pulverizer Co., 18th & Austin Sts., St. Louis
C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland
Blanchard Machine Co., 64 State St., Cambridge, Mass.
Brill Equipment Corp., 133 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
Gruendler Patent Crusher & Pulverizer Co., 900 N. First St., St. Louis
B. F. Gump Co., 431 S. Clinton St., Chicago
Houchin Machy. Co., Hawthorne, N. J.
Huber Machine Co., 259 46th St., Brooklyn
Kent Machine Works, 39 Gold St., Brooklyn
Lancaster Iron Works, Lancaster, Pa.
J. M. Lehmann Co., 248 Broadway, N. Y.
Olsen & Tilgner Mfg. Co., 2276 Elston Ave., Chicago
Prater Pulverizer Co., 1829 S. 55th Ave., Chicago
Chas. Ross & Sons, 150 Classon Ave., Brooklyn
Patterson Foundry & Machine Co., East Liverpool, Ohio
Sprout Waldron & Co., Muncy, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
F. I. Stokes Machine Co., Philadelphia, Pa.
Sturtevant Mill Co., Harrison Sq., Boston
Williams Patent Crusher & Pulverizer Co., St. Louis

GUMS

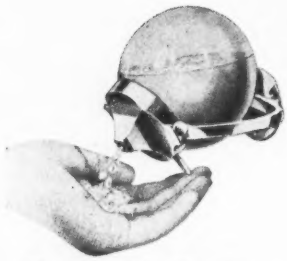
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
C. W. Campbell Co., 157 Chambers St., N. Y.
T. G. Cooper & Co., 47 N. 2nd St., Philadelphia
Dodge & Olcott Co., 180 Varick St., N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago
R. Gesell, Inc., 200 W. Houston St., N. Y.
J. L. Hopkins & Co., 220 Broadway, N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
George H. Lincks, 123 Front St., N. Y.
Neuman-Buslee & Wolfe, 224 W. Huron St., Chicago
Orbis Products Corp., 215 Pearl St., N. Y.
S. B. Penick & Co., 132 Nassau St., N. Y.
R. J. Prentiss & Co., 100 Gold St., N. Y.
J. H. Redding, Inc., 17 Battery Place, N. Y.
R. F. Revson Co., 91 7th Ave., N. Y.
Rohm & Haas Co., 222 W. Washington Sq., Philadelphia
H. H. Rosenthal Co, 25 E 26th St., N. Y.
William H Scheel, Inc., 193 Water St., N. Y.
Stein, Hall & Co., 285 Madison Ave., N. Y.
Stephens-Adamson Co., Aurora, Ill.
Stroock & Wittenberg, Lincoln Bldg., N. Y.
Thurston & Braidich, 55 Van Dam St., N. Y.
Arthur C. Trask Co., 4102 S. La Salle St., Chicago

GUNS, Powder (see BELLOWS, Insect Powder)

GYM-FINISH FLOOR SEAL (see FLOOR FINISHES)

Sanitary Supplies by CLIFTON

The Duodek Soaper



The Tiltype Soap Dispenser

featuring

★ QUALITY
★ PRICE
★ SERVICE

LIQUID SOAPS and BASES

FOAMWEL LIQUID SOAP—Foamwel gives a quick, profuse lather in both hard or soft water. Rinses off quickly. Soft and smooth. Made from pure cocoanut oil and aged in cypress tanks. For these reasons Foamwel is superior to ordinary liquid soap.

CLIFTON LIQUID SOAP CONCENTRATE—A concentrated product used for the manufacture of liquid soap by merely adding 2 to 3 times as much plain hydrant water. Clifton Liquid Soap Concentrate is made from the same high grade materials as Foamwel but more concentrated.

CLIFTON LIQUID SOAP BASE—Solid form. A sparkling clear concentrated base made from the same basic materials as above. Recommended for those who have facilities to use the solid material. Break up in small pieces and dissolve in 2 or 3 times as much water. Add perfume and coloring if desired.

SEMI-CASTILE LIQUID SOAP—Made from half olive oil and half cocoanut oil. Used where an extra bland and unguent soap is required. Recommended for delicate hands.

OLIVE OIL SYRUP—A concentrated product to which water may be added before filling dispensers. Contains a percentage of cocoanut oil to enhance lather. Used in hospitals for extra emollience.

POLISHES, ETC.

RUB-NO LIQUID WAX—For floors. Dries bright without polishing. Does a better job than old style waxes and saves considerable labor.

PREPARED LIQUID WAX—Requires polishing. For floors, furniture, woodwork, autos. Apply with cloth and allow to dry for a few minutes. Polish with soft rag to bring out rich lustre.

DAZZLE METAL POLISH—A liquid polish for all metals. It is non-inflammable and non-settling. A lazy man's polish—maximum lustre with least effort.

GRADE "A" FURNITURE CREAM—Imparts delightful lustre to furniture and woodwork. Leaves a hard, glossy, dust-resisting surface.

LUSTRA BAR OIL—Keeps bars and woodwork clean and shiny and water-resistant. Lustra is the bartender's friend.

MOP-IN-VAR—A high grade mopping varnish made from synthetic P. C. Indene resins. Apply to all types of floors with the exception of rubber or asphalt. Reduces maintenance costs.

DISINFECANTS, ETC.

PINE TREE DISINFECTANT—Gives a snow-white emulsion when added to water and is preferred by some because of the pleasant aromatic piney aroma that it imparts. Its great advantage is its efficiency coupled with its aromatic odor. The color is a light straw and it is unusually clear and transparent. Most people prefer this sparkling light colored pine disinfectant.

CRESOLENE DISINFECTANT— A coal tar disinfectant made from extra selected grade of distilled tar acids. Cresolene has a refreshing carbolic odor and gives a milk-white emulsion in either soft or hard water. Cresolene is not to be compared with the usual run of coal tar disinfectants that are made to meet a price. Coefficient 2.

HIGH COEFFICIENT DISINFECTANT—Has a coefficient of 16 and higher. Expertly formulated and blended. Used extensively to fortify the lower grades of disinfectant. Economical.

INSECTICIDES, ETC.

INSECTOL—Kills flies, moths, mosquitoes, roaches, fleas, bed bugs, and other insects. Very powerful and efficient. Extremely economical as a small amount is needed. Has a pleasing odor.

MOTH-BLITE FROST—Kills moths, eggs, larvae. Use in a hand sprayer on woolens, clothes, furs, rugs, etc. Deposits a white frost which slowly disappears. Stainless and non-explosive.

MIST-O-CIDE—To be used in electric automatic insector. An odorless, highly concentrated extract which has high killing power.

MOTH CAKES
Pure Paradichlorbenzene

VEGETABLE OIL CLEANSERS, ETC.

PINE-GLOSS CLEANSER—For glossy surfaces. A new principal bland syrup-like cleanser to be used about one or two cups to a pail of water. Leaves a bright finish on varnished woodwork, furniture and automobiles. Cleans with a minimum of effort.

SHINE-BRITE—Of the same general characteristics as Pine-Gloss Cleanser except that it has a mild perfume odor in place of the pine smell. The modern way to clean and preserve floorings is by the use of Shine-Brite.

METEOR OIL SOAP—A light amber neutral potash vegetable oil soap recommended wherever a bland soft soap is desirable—in general on all glossy surfaces. Contains 45% anhydrous contents. Sometimes called Hospital Green Soap—same general style as Meteor but designed for hospital use.

DAZZLE SILVER POLISH (Mineral Paste)—A white mineral polishing cream which imparts a high lustre on silver, plated ware, gold, chromium, glassware. A very fine mesh mineral is used to prevent scratching.

DEODORIZING BLOCKS

SENTINELS—Deodorizing Cakes De Luxe.

DEODORETTES — Popular priced cakes packed in tubes.

PACKING

PACKING—To meet your requirements, from 55 gal. drums down to 1 gal. cans for liquids. Liquid soap base, oil soap, etc., put up in 450-lb. bbls., 250 lb. ½ bbls., 140 lb. kegs, 65 lb. tubs.

ATTRACTIVE IMPRINT LABELS — and forceful sales-producing circulars are part of Clifton service you are entitled to.

EXACTNESS—Every product described will do exactly what it is intended to do efficiently and economically. No bombastic or impossible claims are made and no Clifton representative is knowingly permitted to make such claims.

CLIFTON CHEMICAL CO., INC.
246 FRONT STREET NEW YORK, N. Y.

HAND (Mechanic's) SOAP

Ampion Corp., 4-88 47th Ave., Long Island City, N. Y.
Antiseptol Co., 5524 Northwest Highway, Chicago
Armour & Co., 1355 W. 31st St., Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Buck-Jack Co., 3056 Federal St., Baltimore
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Colgate-Palmolive-Peet Co., Jersey City, N. J.
Columbia Soap & Chem. Co., Inc.,
324 Leavenworth St., San Francisco
Cudahy Packing Co., 221 N. La Salle St., Chicago
Davies Young Soap Co., Dayton, O.
Delta Chemical Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
J. Eavenson & Sons, Del. & Penn Sts., Camden, N. J.
A. C. Fergusson Co., Drexel Bldg., Phila.
Flash Chem. Co., 160 2nd St., Cambridge, Mass.
Fuld Bros., 702 S. Wolfe St., Baltimore
Hewitt Soap Co., Dayton, O.
Hockwald Chem. Co., 135 Mississippi St., San Francisco
R. M. Hollingshead Co., Camden, N. J.
Hubman Supply Co., 225 N. 4th St., Columbus, O.
Jansen Soap & Chemical Co., 324 Leavenworth St.,
San Francisco, Cal.
Mione Mfg. Co., Collingdale, Pa.
Morgan Chemical Co., Harrisburg, Pa.
National Sanitary Prods. Co., 217 N. 2nd St., St. Louis
North Coast Soap & Chem. Wks., Seattle, Wash.
Palmer Products, Inc., Waukesha, Wis.
Paper Makers Chem. Div., Hercules Powder Co.,
Wilmington, Del.
Procter & Gamble Co., Cincinnati
Puritan Soap Co., 573 Lyell Ave., Rochester, N. Y.
Theo. B. Robertson Prods. Co., 700 W. Division St.,
Chicago
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
Skat Co., Hartford, Conn.
John T. Stanley Co., 642 W. 30th St., N. Y.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
Trojan Products & Mfg. Co.,
3107 S. Wabash Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
United Cleanser Mfg. Co., 160 Second St.,
Cambridge, Mass.
U. S. Sanitary Spec. Corp., 435 S Western Ave, Chicago
Utility Co., 636 W. 44th St., N. Y.
Vanco Co., Manchester, Conn.
Vliet Soap Co., 638 Monroe St., Brooklyn

HAND SOAP, Powdered

Ampion Corp., 4-88 47th Ave., Long Island City, N. Y.
Armour & Co, 1355 W. 31st St., Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Cerrol Co., 4250 N. Crawford Ave., Chicago
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
J. Eavenson & Sons, Camden, N. J.
Fuld Bros., Baltimore
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Hubman Supply Co., 225 N. 4th St., Columbus, O.
La Maison Products, Inc., 80 York St., Brooklyn
Packwood Mfg. Co., St. Louis
Palmer Products, Inc., Waukesha, Wis.
Port Huron Detergent Co., Port Huron, Mich.
Presto Mfg. Co., Myrtle and Curfew Sts., St. Paul, Minn.
Procter & Gamble Co., Cincinnati
Puritan Soap Co., 573 Lyell Ave., Rochester, N. Y.
Theo. B. Robertson Prods. Co.,
700 W. Division St., Chicago
Rochester Germicide Co., Rochester, N. Y.
John T. Stanley Co., 642 W. 30th St., N. Y.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
U. S. Sanitary Specialties Corp., 435 S. Western Ave.,
Chicago
Warren Soap Mfg. Co., Cambridge, Mass.
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

HARD WATER SOAPS (Coconut Oil Bar Soaps)

Armour Soap Wks., 1355 W. 31st St., Chicago
Baum's Castorine Co., Rome, N. Y.
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
James Counts Soap Co., 2nd & Washington Aves., St.
Louis
Crystal Soap & Cem. Co., 6300 State Rd., Philadelphia
Cudahy Packing Co., 221 N. LaSalle St., Chicago
Davies-Young Soap Co., Dayton, O.
James Good, Inc., 2116 E. Susquehanna Ave., Philadelphia
Harley Soap Co., Pierce & Orthodox Sts., Phila., Pa.
Hewitt Soap Co., Dayton, Ohio
Higley Chemical Co., Dubuque, Iowa
Jansen Soap & Chemical Co., 324 Leavenworth St. San
Francisco, Calif.
Los Angeles Soap Co., Los Angeles, Calif.
National Oil Prods. Co., Harrison, N. J.
National Soap Co., 357 South 25th St., Tacoma, Wash.
Newell Gutradt Co., 350 Fremont St., San Francisco, Cal.
North Coast Soap & Chem. Works, Seattle, Wash.
Peck's Prod. Co., 5224 N. 2nd St., St. Louis
Procter & Gamble Co., Cincinnati
Theo. B. Robertson Prods. Co., 700 W. Division St.,
Chicago
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
John T. Stanley Co., 642 W. 30th St., N. Y
Swift & Co., Union Stock Yards, Chicago
Vliet Soap Co., 638 Monroe St., Brooklyn
Warren Soap Mfg. Co., 51 Waverly St., Cambridge,
Mass.
M. Werk Co., St. Bernard, Cincinnati
Allen B. Wrisley Co., 6801 W. 65th St., Chicago, Ill.
Chas. W. Young & Co., 1247 N. 26th St, Philadelphia

HELIOTROPIN (see AROMATIC CHEMICALS)

HOLDERS (Deodorizing Block)
(see also Cans, Fibre)

Chemical Mfg. & Dist. Co., Easton, Pa.
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Cin-Made Corp., (fibre), 294 Eggleston Ave., Cincinnati
Clifton Chemical Co., 247 Front St., N. Y.
Eagle Soap Corp., Huntington, Ind.
Edelman Co., 6249 S. St. Lawrence Ave., Chicago
Elkay Products Corp., 323 W. 16th St., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
Garnet Chem. Corp., 911 N. Lumber St., Allentown, Pa.
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Jansen Soap & Chemical Co., 324 Leavenworth St.,
San Francisco, Cal.
National Sanitary Chem. Co., Baltimore, Md.
Palmer Products, Inc., Waukesha, Wis.
Theo. B. Robertson Prods. Co.,
700 W. Division St., Chicago
Rochester Germicide Co., 16 Downing Pl., Rochester, N.Y.
U. S. Sanitary Specialties Corp.,
435 S. Western Ave., Chicago

HOMOGENIZERS (DISPERSION EQUIPMENT)

Abbe Engineering Co., 50 Church St., N. Y.
Manton-Gaulin Mfg. Co., 19 Charlton St., Everett, Mass.
Wurster & Sanger, 5201 S. Kenwood Ave., Chicago

HORTICULTURAL SPRAY BASE (see PETROLEUM BASES)

HOUSEHOLD AMMONIA (prepared, in bulk and private brand)

Chemical Supply Co., 2450 Canal Rd., Cleveland
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14—37th Ave., Long Island City,
N. Y.
Fergusson Laboratories, Drexel Bldg., Philadelphia
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., Kensington, Philadelphia
Haag Laboratories, Inc., 6101 S. May St., Chicago
Hockwald Chem. Co., 30 Bluxome St., San Francisco
R. M. Hollingshead Corp., Camden, N. J.
Merck & Co., Rahway, N. J.
Theo. B. Robertson Prods. Co.,
700 W. Division St., Chicago, Ill.
Shores Co., Cedar Rapids, Iowa
John T. Stanley Co., Inc., 642 W. 30th St., N. Y.
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2. FAST PARALYZING ACTION — *It is well recognized that* LETHANE 384 *and* LETHANE 384 *Special give sprays outstanding speed of action. Manufacturers everywhere agree that* LETHANE'S *faster knockdown is a powerful aid in selling the efficiency factor of their sprays.*

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American Mothproof Co., 2330 W. View St., Los Angeles
Ampion Corp., 4-88 47th Ave., Long Island City, N. Y.
An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Cal.
Antiseptol Co., 5524 Northwest Highway, Chicago
Baird & McGuire, Inc., Holbrook, Mass.
Baird & McGuire Inc. of Mo., St. Louis
Barton Chemical Co., 3907 S. Langley Ave., Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Cary Mfg. Co., Joliet, Ill.
Cenol Co., 4250 N. Crawford Ave., Chicago
Chemical Compounding Corp., 262 Huron St., Brooklyn
Chemical Mfg & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
Columbia Soap & Chem. Co., Inc., 324 Leavenworth St., San Francisco
Crystal Soap & Chem. Co., 6300 State Rd., Philadelphia
Davies-Young Soap Co., Dayton, O.
Delta Chemical Co., 4 Payson Ave., N. Y.
Derris, Inc., 79 Wall St., N. Y.
C. B. Dolge Co., Westport, Conn.
Elkay Products Corp., 323 W. 16th St., N. Y.
Eagle Soap Corp., Huntington, Ind.
Edelman Co., 6249 S. St. Lawrence Ave., Chicago
Exterminating Materials Co., 555 W. 22nd St., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Philadelphia
Goulard & Olena, 140 Liberty St., N. Y.
Haag Laboratories, Inc., 6101 S. May St., Chicago
Harley Soap Co., Pierce & Orthodox Sts., Phila.
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
R. M. Hollingshead Corp., Camden, N. J.
Hubman Supply Co., 225 N. 4th St., Columbus, O.
James Huggins & Son, 239 Medford St., Malden, Mass.
Hunt Mfg. Co., Lisbon Rd., Cleveland
Jansen Soap & Chemical Co., 324 Leavenworth St., San Francisco
Kemiko Mfg. Co., 500 Chancellor Ave., Irvington, N. J.
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Maywood Pest Exterminators, 1413 Washington Blvd., Maywood, Ill.
McCormick & Co., Baltimore, Md.
M. & H. Laboratories, 2703-5 Archer Ave., Chicago
Midway Chemical Co., 5235 W. 65th St., Chicago
Edgar A. Murray Co., 2703 Guoin St., Detroit
National Sanitary Prods. Co., 217 N. 2nd St. St. Louis
Palmer Products, Inc., Waukesha, Wis.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Perrow Chem. Co., Hurt, Va.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Rochester Germicide Co., Rochester, N. Y.
Schaeffer Bros. & Powell Mfg., 102 Barton St., St. Louis, Mo.
Selig Co., 336 Marietta St., Atlanta, Ga.
Shores Co., Cedar Rapids, Ia.
Sinclair Refining So., East Chicago, Ind.
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
S. S. Stafford, Inc., 603 Washington St., N. Y.
Standard Oil Co., of Calif., San Francisco
Standard Oil Co., (Ind.) 910 S. Michigan Ave., Chicago
Standard Oil Co., (Ohio) Midland Bldg., Cleveland
Trojan Products & Mfg. Co., 3107 S. Wabash Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Uncle Sam Chemical Co., 329 E. 29th St., N. Y.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
Victory Chem. Co., 148 Fairmount Ave., Philadelphia
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Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
Crystal Soap & Chemical Co., 6300 State Rd., Phila.
Delta Chemical Co., 4 Payson Ave., N. Y.
Derris, Inc., 79 Wall St., N. Y.
Eagle Soap Corp., Huntington, Ind.
Elkay Products Corp., 323 W. 16th St., N. Y.
Exterminating Materials Co.. 555 W. 22nd St., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Philadelphia
Goulard & Olena, Inc., 140 Liberty St., N. Y.
Haag Laboratories, 6101 S May St., Chicago
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
R. M. Hollingshead Corp., Camden, N. J.
Hubman Supply Co., 225 N. 4th St., Columbus, O.
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
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Palmer Products, Inc., Waukesha, Wis.
S.B. Penick & Co., 132 Nassau St., N. Y.
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Ratin Labs., 116 Broad St., N. Y.
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Rochester Germicide Co., Rochester, N. Y.
Selig Co., 336 Marietta St., Atlanta, Ga.
Shores Co., Cedar Rapids, Ia.
S. S. Stafford, Inc., 603 Washington St., N. Y.
Trojan Products & Mfg. Co., 3107 S. Wabash Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Uncle Sam Chemical Co., 329 E. 29th St., N. Y.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
Victory Chem. Co., 148 Fairmount Ave., Philadelphia
White Tar Co., Kearny, N. J.

HYDROGENATED OILS

Armour & Co., 1355 W. 31st St., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
Emery Industries, 43 Carew Tower, Cincinnati
W. C. Hardesty Co., Inc., 41 E. 42nd St, N. Y.
Hooker Electrochemical Co., Niagara Falls, N. Y.
Spencer Kellogg & Sons., Buffalo, N. Y.
Procter & Gamble Co., Cincinnati, O.
Werner G. Smith Co., 2191 W. 110th St., Cleveland
Wecoline Products, Inc., 15 E. 26th St., New York
Wesson Oil & Snowdrift Co., 21 West St., N. Y.
Wyandotte Oil Co., Wyandotte, Mich.

HYDROGENATION PLANTS (see OIL HYDROGENATION PLANTS)

HYDROSULFITES (Soap Bleaches)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Jungmann & Co., 157 Chambers St., N. Y.
Monsanto Chem. Co., St. Louis
Richards Chem. Wks., Warren & Morris St., Jersey City, N. J.
Rohm & Haas Co., Inc., 222 W. Washington Sq., Phila.
Royce Chem. Co., Carlton Hill, N. J.

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Pyressenol No. 20 Odorless

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Pyrethrum, Derris and Cube Powders

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Derris and Cube Resins

Rotessenol AG Concentrate

Pyrethrum and Rotenone Extracts

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(4% and 5% Rotenone—200 Mesh)

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INSECT FLOWERS (see PYRETHRUM)

INSECT POWDER (see PYRETHRUM)

INSECT POWDER GUNS (see BELLOWS)

INSECTICIDE BASE (see PETROLEUM BASES)

INSECTICIDE CONCENTRATES, Synthetic

Associated Chemists, Inc., 2947 Oakley Ave., Chicago
Dodge & Olcott Co., 180 Varick St., N. Y.
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Hercules Powder Co., Wilmington, Del.
John Powell & Co., 114 E. 32nd St., N. Y.
Rohm & Haas, Inc., 222 W. Washington Sq., Phila.
U. S. Industrial Chem. Inc., 60 E. 42nd St., N. Y.
Whitmire Research Corp., 339 S. Vandeventer, St. Louis

INSECTICIDE SPRAY PERFUMES (see also PERFUMING MATERIALS)

Allondon-Bayonne Co., 11 Park Place, N. Y.
van Ameringen-Haebler, Inc., 315 4th Ave., N. Y.
Aromatic Products, Inc., 15 E. 30th St., N. Y.
Antoine Chiris Co., 115 E. 23rd St., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
P. R. Dreyer Inc., 119 W. 19th St., N. Y.
E. I. Du Pont de Nemours, Wilmington, Del.
Felton Chemical Co., 603 Johnson Ave., Brooklyn
Fritzsche Bros., Inc., 76 Ninth Ave., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
Givaudan-Delawanna, Inc., 330 W. 42nd St., N. Y.
Higley Chem. Co., Dubuque, Iowa
Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., N. Y.
Norda Essential Oil & Chem. Co., 601 W. 26th St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
Rifa-New York, Inc., 153 Waverly Pl., N. Y.
Schimmel & Co., 601 W. 26th St., N. Y.
Tombarel Prods. Corp., 9 E. 19th St., N. Y.

INSECTICIDE SPREADERS (See Clays)

INSECTICIDE TESTING (see CONSULTANTS)

INSECTICIDES (see HOUSEHOLD INSECTICIDES, AGRICULTURAL INSECTICIDES)

INSTRUMENTS, Meters, Gauges, Thermometers, Etc.

Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland
Bausch & Lomb Optical Co., Rochester, N. Y.
S. F. Bowser & Co., 1300 E. Creighton Ave., Ft. Wayne, Ind.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Wayne & Windrim Sts., Phila.
Buffalo Meter Co., 2890 Main St., Buffalo, N. Y.
Cambridge Instrument Co., 3732 Grand Central Terminal, N. Y.
G. M. Davis Regulator Co., 2541 S. Washtenaw, Chicago
Eimer & Amend, 19th St., 3rd Ave., N. Y.
Foxboro Co., Foxboro, Mass.
Liquidometer Corp., Long Island City, N. Y.
Pneumercator Co., Sperry Bldg., Brooklyn
Precision Thermometer Co., 1434 Brandywine St., Phila.
Read Machy. Co., York, Pa.
Republic Flow Meters Co., 2240 Diversey Blvd., Chicago
Taylor Instrument Co., Rochester, N. Y.

IONONE (Violet Base) (see AROMATIC CHEMICALS)

ISO-PROPYL ALCOHOL (see ALCOHOL, ISO-PROPYL)

JAPAN WAX (see WAXES)

JARS, GLASS (see BOTTLES)

JASMIN, ARTIFICIAL (see AROMATIC CHEMICALS)

KAOLIN (see CLAYS)

KEROSENE (see PETROLEUM)

KETTLES

Alloy Prods. Corp., 221 Madison St., Waukesha, Wis.
Alsop Engineering Corp., 100 High St., Milldale, Conn.
Aluminum Co. of America, Gulf Bldg., Pittsburgh
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Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
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Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259—46th St., Brooklyn
Lancaster Iron Works, 564 S. Prince St., Lancaster, Pa.
Alan Porter Lee, 136 Liberty St., N. Y.
Littleford Bros., 443 E. Pearl St., Cincinnati
Newman Tallow & Soap Machy. Co., 1051 W. 35th St., Chicago.
Patterson Foundry & Machine Co., East Liverpool, O.
Pfaudler Co., 89 East Ave., Rochester, N. Y.
Sowers Mfg. Co., 1296 Niagara St., Buffalo, N. Y.
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Struthers-Wells Co., Warren, Pa.
Stuart & Peterson Co., Burlington, N. J.
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Alsop Engineering Corp., 100 High St., Milldale, Conn.
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Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
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Edward Ermold Co., 652-64 Hudson St., N. Y.
J. L. Ferguson Co., Joliet, Ill.
National Labeling Machine Co., 129 W. 19th St., Long Island City, N. Y.
New Jersey Machine Corp., Hoboken, N. J.
Pneumatic Scale Corp., Norfolk Downs, Mass.
F. B. Redington Co., 112 S. Sangamon St., Chicago
Scientific Filter Co., 1 Franklin Square, N. Y.

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Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
New Jersey Machine Corp., Hoboken, N. J.
Pneumatic Scale Corp., Norfolk Downs, Mass.
Scientific Filter Co., 1 Franklin Square, N. Y.
Stokes & Smith Co., Summerdale, Phila., Pa.

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American Lithographic Co., 85 N. 3rd St., Brooklyn
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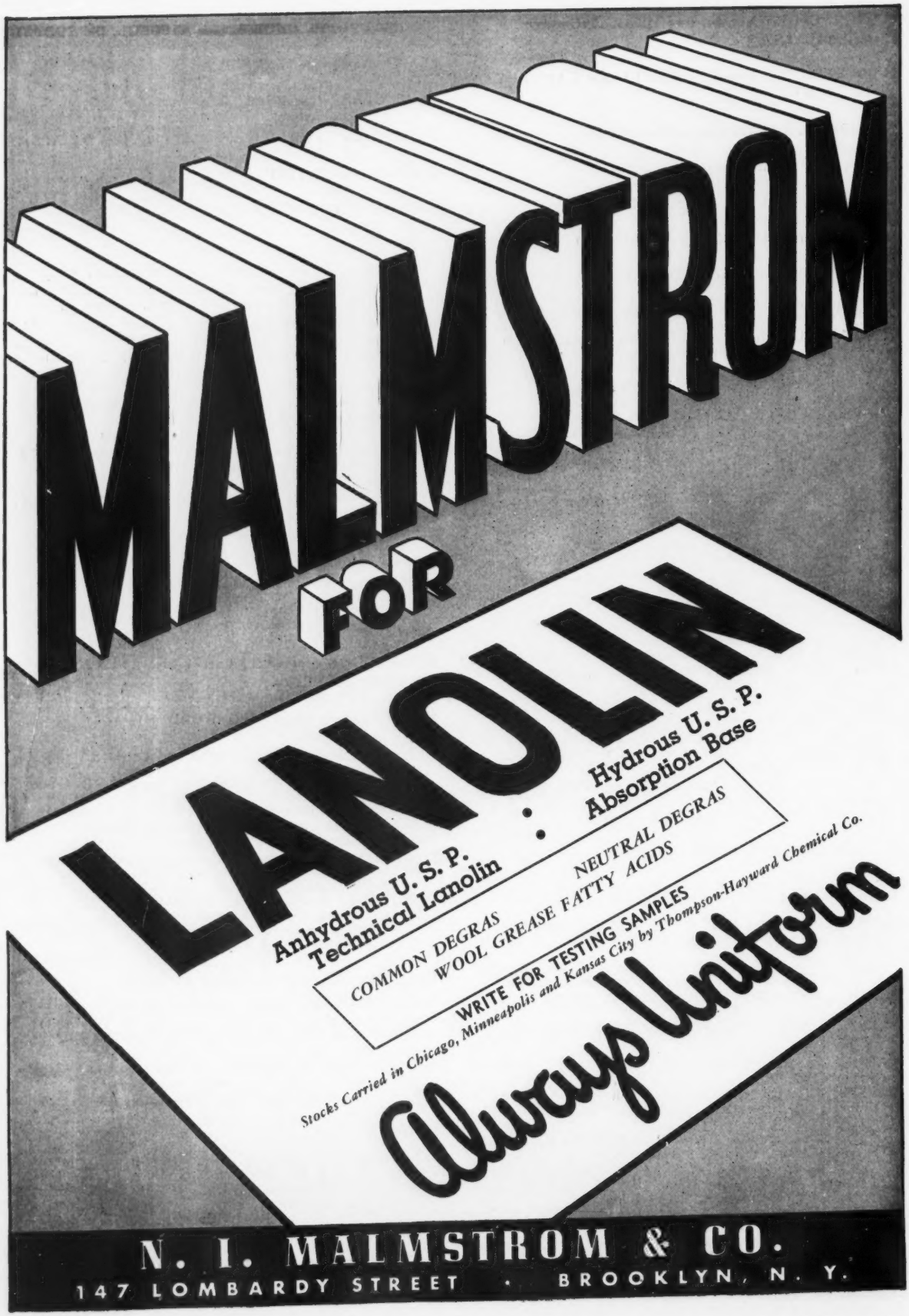
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Pfaltz & Bauer, Inc., 350 5th Ave., N. Y.
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Cole Chemical Co., 22-14—37th Ave., Long Island City, N. Y.
Delta Chemical Mfg. Co., 2101 Washington Blvd., Baltimore (Sodium & Calcium Hypochlorite)
Higley Chemical Co., Dubuque, Iowa
Hysan Products Co., 2560 Armitage Ave., Chicago
H. Kohnstamm & Co., 91 Park Pl., N. Y.
Legrand Bleach Corp., 111-49th St., Brooklyn
Mathieson Alkali Wks., 60 E. 42nd St., N. Y.
Monsanto Chemical Co., St. Louis, Mo.
Peck's Prods. Co., St. Louis
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Surpass Chemical Co., Albany, N. Y.
Thompson-Hayward Chemical Co., 2915 Southwest Blvd., Kansas City, Mo.
Jos. Turner & Co., Ridgefield, N. J.
Warner Chemical Co., 405 Lexington Ave., N. Y.

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American Fluoride Corp., 151 W. 19th St., N. Y.
American Soap & Washoline Co., Cohoes, N. Y.
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Cowles Detergent Co., 7016 Euclid Ave., Cleveland
Diamond Alkali Co., 535 Smithfield Ave., Pittsburgh
Fezandie & Sperrle, 205 Fulton St., N. Y.
Interstate Color Co., 5 Beekman St., N. Y.
H. Kohnstamm & Co., 91 Park Pl., N. Y.
Napthole, Inc., 15 E. 26th St., N. Y.
National Aniline & Chemical Co., 40 Rector St., N. Y.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Pylam Products Co., 799 Greenwich St., N. Y.

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Cudahy Packing Co., 221 N. La Salle St., Chicago
Du Bois Soap Co., Cincinnati, O.
J. Eavenson & Sons, Del. & Penn Sts., Camden, N. J.
Fels & Co., Philadelphia
Hewitt Soap Co., Dayton, O.
Lightfoot Schultz Co., 1412 Park Ave., Hoboken, N. J.
Long Island Soap Co., Meeker Ave. & Bridgewater St., Brooklyn
Los Angeles Soap Co., Los Angeles, Calif.
Manhattan Soap Co., Bristol, Pa.
Geo. E. Marsh Co., 200 Broadway, Cambridge, Mass.
National Soap Co., 357 S. 25th St., Tacoma, Wash.
Newell Gutradt Co., 350 Fremont St., San Francisco, Cal.
Procter & Gamble Co., Cincinnati
North Coast Chem. & Soap Wks., Seattle, Wash.
John T. Stanley Co., 642 W. 30th St., N. Y.
Swift & Co., Union Stock Yards, Chicago
Vliet Soap Co., 638 Monroe St., Brooklyn, N. Y.
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
M. Werk Co., St. Bernard, Cincinnati
Allen B. Wrisley Co., 6801 W. 65th St., Chicago, Ill.
Chas. W. Young & Co., 1247 N. 26th Ct., Phila.

LAUNDRY SOAP, CHIP

American Soap & Washoline Co., Cohoes, N. Y.
Armour Soap Wks., 1355 W. 31st St., Chicago
Beach Soap Co., Lawrence, Mass.
Chemical Mfg. & Dist. Co., Easton, Pa.
Colgate-Palmolive-Peet Co., Jersey City, N. J.
Du Bois Soap Co., Cincinnati, O.
J. Eavenson & Sons, Del. & Penn Sts., Camden, N. J.
Harris Soap Co., Buffalo, N. Y.
Haskins Bros. & Co., Sioux City, Iowa
Hewitt Soap Co., Dayton, Ohio
H. Kohnstamm & Co., 91 Park Pl., N. Y.
Lightfoot Schultz Co., 1412 Park Ave., Hoboken, N. J.
Long Island Soap Co., Meeker Ave. & Bridgewater St., Brooklyn
Los Angeles Soap Co., Los Angeles, Calif.
Geo. E. Marsh Co., 200 Broadway, Cambridge, Mass.
Nat'l Milling & Chem. Co., Manayunk, Phila.
National Oil Prods Co., Harrison, N. J.
National Soap Co., 357 South 25th St., Tacoma, Wash.
North Coast Soap & Chem. Wks., Seattle, Wash.
Procter & Gamble Co., Cincinnati
John T. Stanley Co., 642 W. 30th St., N. Y.
Swift & Co., Union Stock Yards, Chicago
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
M. Werk Co., St. Bernard, Cincinnati
Allen B. Wrisley Co., 6801 W. 65th St., Chicago, Ill.
Chas. W. Young & Co., 1247 N. 26th St., Phila.

LAUNDRY SOAP, POWD. AND GRAN.

American Soap Powder Wks., 100 Van Dyke St., Brooklyn, N. Y.
American Soap & Washoline Co., Cohoes, N. Y.
Armour Soap Wks., 1355 W. 31st St., Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Beach Soap Co., Lawrence, Mass.
Chemical Mfg. & Dist. Co., Easton, Pa.
Colgate-Palmolive-Peet Co., Jersey City, N. J.
Cudahy Packing Co., 221 N. La Salle St., Chicago
Du Bois Soap Co., Cincinnati, O.
J. Eavenson & Sons, Del. & Penn Sts., Camden, N. J.
Hewitt Soap Co., Dayton, Ohio
H. Kohnstamm & Co., 91 Park Pl., N. Y.
Los Angeles Soap Co., Los Angeles, Calif.
Geo. E. Marsh Co., 200 Broadway. Cambridge, Mass.
Napthole, Inc., 15 E. 26th St., N. Y.
Nat'l Milling & Chem. Co., Manayunk, Phila.
National Oil Prods. Co., Harrison, N. J.
National Soap Co., 357 South 25th St., Tacoma, Wash.
North Coast Soap & Chem. Wks., Seattle, Wash.
Peck's Products Co., 5224 N. 2nd St., St. Louis, Mo.
Port Huron Detergent Co., Port Huron, Mich.
Procter & Gamble Co., Cincinnati

LAUNDRY SOAP, POWD. and GRAN. (Contd.)

John T. Stanley Co., 642 W. 30th St., N. Y.
Stevens Soap Corp., 202 Sullivan St., Brooklyn
Swift & Co., Union Stock Yards, Chicago
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
M. Werk Co., St. Bernard, Cincinnati
Allen B. Wrisley Co., 6801 W. 65th St., Chicago, Ill.
Chas. W. Young & Co., 1247 N. 26th St., Phila.

LAUNDRY SODA, see SODA

LAUNDRY SOURS (Fluoride, etc.)

Allied Consolidated Industries, Trenton, N. J.
Aluminum Co. of America, Gulf Bldg., Pittsburgh
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
American Fluoride Corp., 151 W. 19th St., N. Y.
Blockson Chemical Co., Joliet, Ill.
Chemical Mfg. & Dist. Co., Easton, Pa.
Diamond Alkali Co., 535 Smithfield Ave., Pittsburgh, Pa.
General Chem. Co., 40 Rector St., N. Y.
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Hummel Chem. Co., 90 West St., N. Y.
Hysan Products Co., 2560 Armitage Ave., Chicago
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
H. Kohnstamm & Co., 91 Park Pl., N. Y.
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
Port Huron Detergent Co., Port Huron, Mich.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Standard Chem. Co., Columbus, O.
Thompson-Hayward Chemical Co., 2915 Southwest Blvd., Kansas City, Mo.
V. C. Products Co., Philadelphia
Victor Chemical Wks., 141 W. Jackson Blvd., Chicago
Chas. W. Young & Co., 1247 N. 26th St., Phila.

LAURIC ACID (see also FATTY ACIDS)

Wecoline Products, Inc., 15 East 26th St., N. Y.
Woburn Degreasing Co. of N. J., 1200 Harrison Ave., Harrison, N. J.

LAURYL ALCOHOL

E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
Michel Export Co., 95 Broad St., N. Y.

LAVENDER OIL (see ESSENTIAL OILS)

LEAD ARSENATE

American Cyanamid & Chem Co., 30 Rockefeller Plaza, N. Y.
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
General Chemical Co., 40 Rector St., N .Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y
Sherwin-Williams Co., Cleveland, O.
Walco Products, Inc., 512 Greenwich St., N. Y.

LECITHIN

American Lecithin Corp., Corona Ave., Elmhurst, L. I.
Digestive Ferments Co., 930 Henry St., Detroit
R. W. Greeff & Co., 10 E. 40th St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Merck & Co., Rahway, N. J.
Soya Corp. of America, 30 Rockefeller Plaza, N. Y.
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Wilson Labs., 4221 S. Western Blvd., Chicago

LEMON OIL (see ESSENTIAL OILS)

LEMONGRASS OIL (see ESSENTIAL OILS)

LIME (Live and Hydrated)

E. I. Du Pont de Nemours, Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Lehigh Lime Co., 111 W. Washington St., Chicago
National Gypsum Co., 192 Delaware Ave., Buffalo, N. Y.
William H. Scheel, Inc., 193 Water St., N. Y.
U. S. Lime Prods. Corp., 85 Second St., San Francisco
Whiterock Quarries, Inc., Bellefonte, Pa.
Whittaker, Clark & Daniels, Inc., 260 West Broadway, N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

LIME SULFUR

Allen Co., Pittstown, N. J.
Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
General Chem. Co., 40 Rector St., N. Y.
Sherwin-Williams Co., Cleveland, O.
Shores Co., Cedar Rapids, Iowa

LINALOE OIL (see ESSENTIAL OILS)

LINALOOL (see AROMATIC CHEMICALS)

LINALYL ACETATE (see AROMATIC CHEMICALS)

LINERS (see BAG LINERS)

LINING MACHINERY (Cartons)

Pneumatic Scale Corp., Norfolk Downs, Mass.
F. B. Redington Co., 112 S. Sangamon St., Chicago

LINSEED OIL
(see also Brokers and Dealers)

Archer-Daniels-Midland Corp., Minneapolis, Minn.
Bisbee Linseed Co., Philadelphia
William O. Goodrich Co., Milwaukee, Wis.
Spencer Kellogg & Sons, Buffalo, N. Y.
Kelloggs & Miller, Amsterdam, N. Y.
Minnesota Linseed Oil Co., Minneapolis, Minn.
Pacific Vegetable Oil Corp., 62 Townsend St., San Francisco
J. H. Redding, Inc., 17 Battery Place, N. Y
A. E. Starkie Co., 528 N. Cuyler Ave., Oak Park, Ill.
Wecoline Products, Inc, 15 E. 26th St., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

LINSEED OIL SOAP (see POTASH SOAPS)

LIQUID SOAP AND BASE (see POTASH SOAP)

MACHINERY (Used) (see USED MACHINERY)

MAGNESIUM CARBONATE

American Cyanamid & Chemical Corp, 30 Rockefeller Plaza, N. Y.
E. I. DuPont de Nemours & Co., Wilmington, Del.
Hercules Powder Co., 961 Market St., Wilmington, Del.
Innis-Speiden & Co., 117 Liberty St., N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

MAGNESIUM OXIDE

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
E. I. du Pont de Nemours & Co., Wilmington, Del.
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Innis-Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

MAGNESIUM STEARATE (see STEARATES)

MANILA GUM

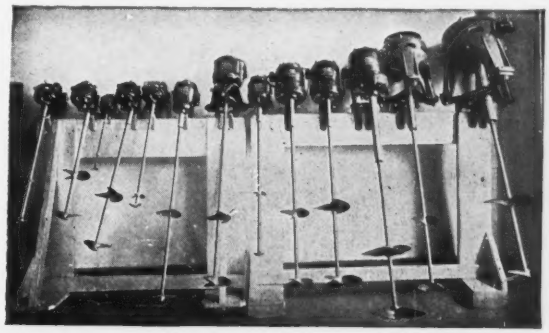
O. G. Innes Corp., 533 Canal St., N. Y.
Stroock & Wittenberg Corp., 60 E. 42nd St., N. Y.
Wm. H. Scheel, Inc., 193 Water St., N. Y.

Hy-Speed EQUIPMENT

for SPEED and ECONOMY in the processing of

Soaps . Disinfectants . Insecticides . Chemicals . Lyes . Oils . Etc.

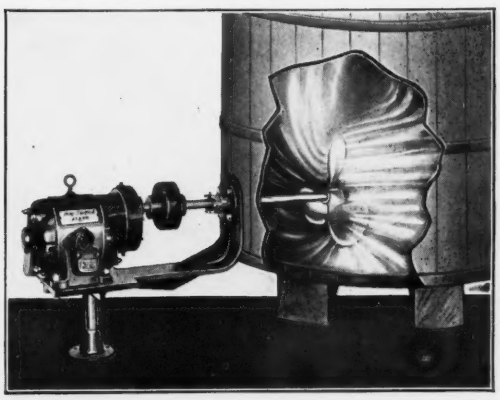
MIXING



A mixer with the most effective combination of power, speed, propeller size, pitch, and area — a mixer that is designed correctly, balanced perfectly, and constructed ruggedly — a mixer that clamps to any tank or other container you now have—is the one that will do your mixing jobs most thoroughly and at a low operating cost.

COMPLETE RANGE FOR ANY MIXING JOB

The many types and sizes of "Hy-Speed" Portable Electric Mixers shown and described in our catalog have been developed to cover the many liquid-mixing problems that had to be solved before it could truly be said that "Hy-Speed Mixers are best for every mixing job." In order that we may recommend the correct mixer for your particular mixing work, we should have some general information about your product, and the work to be done.



AGITATING

There are many processes involving agitation in which a side entering propeller member is desirable or even absolutely essential. The proper engineering of such installations is equally essential for the achievement of exact predetermined results.

MIXING UNITS

Complete Mixing Units consisting of Alsop Glass Coated Tank with Hy-Speed Mixer attached come in all sizes up to 200 gals. Convenient, sanitary, self draining, efficient.

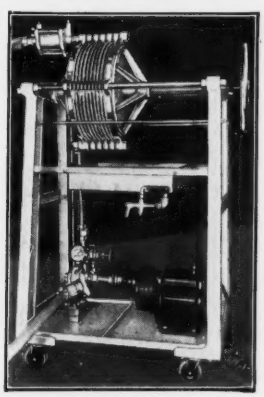


Plate and Frame Disc Filter. Capacities up to 60 gallons per minute.

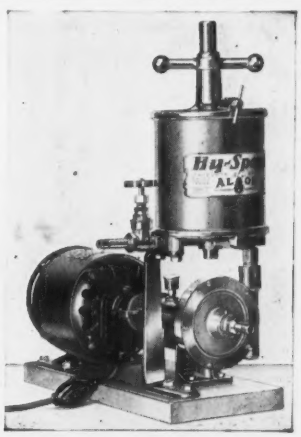
FILTERING

For sediment-free, attractive-looking liquid products

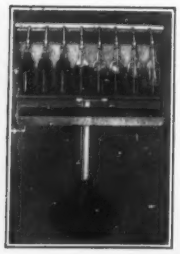
If you're intent on turning out a liquid that is absolutely sediment-free (and will stay that way)—a product that really stands out in attractiveness, you'll be interested in the results obtained with Hy-Speed Ultra Fine Disc Filters.

Hy-Speed Asbestos Discs, the filtering media used, remove every bit of cloud and minute foreign matter and produce a clear brilliant liquid.

Hy-Speed Filters are available in all sizes for any filtering capacity you desire from 1 G. P. M. to 60 G. P. M.



Sealed-Disc Filter, Leak and Vapor Proof. Capacities 1 to 30 gallons per minute.



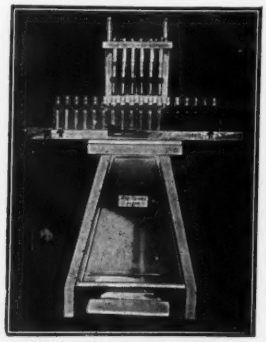
BOTTLE FILLING

Any size or type container from 1 dram up to gallons

ABOVE improved Siphon Filler. RIGHT, Portable Vacuum Filler.

ALSO CANS

We make gravity, portable vacuum, syphon, and semi-automatic vacuum filling machines. In our complete line of filling machines there is one of the right type and capacity to efficiently handle any production large or small from a few dozen per hour to twenty-five thousand per eight-hour day.



Semi-Automatic Filler 2000 qts. per hour

CAPPING

Assures positively air-tight leakproof screw caps of all shapes, styles or sizes

If you are using screw caps on your bottles, cans, or other containers, here's an inexpensive, simplified method of tightening them absolutely securely.

The Hy-Speed Portable Screw Capper is a positive safeguard against waste and rejected shipments caused by leaky containers that have been capped by uncertain, haphazard methods.

HANDLES ANY SIZE CAP

Instantly adjustable for handling any size cap, the unit is ideal for steady production work or for numerous capping jobs in your plant involving a large variety of caps and bottle sizes and styles.

COMPACT . . . SIMPLIFIED . . . INEXPENSIVE

The unit is compact and self contained; it is portable and can be used anywhere in the plant as necessity requires; it is built for continuous duty and costs but a few cents a day to operate.

The machine can be quickly and very accurately adjusted so that any cap can be put on with the exact degree of tightness desired.

Convenient stationary or portable wheeled stands are available.

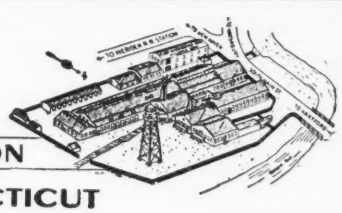
A neat, quick inexpensive method

LABELING

The Hy-Speed Labelit applies to any label up to 8″ wide, a smooth even coating of glue or gum, of just the right thickness so that the label will adhere quickly and perfectly to the container or package without any excess glue squeezing out around the edges to spoil or mar the appearance of the finished product. It handles any and all labels without any adjustments or changes of any kind; gear driven for dependability, completely covered for cleanliness; quickly disassembled for easy and thorough cleaning; it is practical for a few dozen or for thousands of labels a day.

ALSOP

ENGINEERING CORPORATION



MILLDALE *Offices or Representatives in all Principal Cities* **CONNECTICUT**

MARINE SOAPS (see SALT WATER SOAPS)

MARSEILLES SOAP (see TEXTILE SOAPS)

MECHANIC'S SOAP (see HAND SOAP)

MEDICINAL SOAPS, CAKE

Armour Soap Wks., 1355 W. 31st St., Chicago
J. Eavenson & Sons, Del. & Penn Sts., Camden, N. J.
Hewitt Soap Co., Dayton, O.
Los Angeles Soap Co., Los Angeles, Calif.
Newell Gutradt Co., 350 Fremont St., San Francisco, Cal.
Procter & Gamble Co., Cincinnati
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
John T. Stanley Co., 642 W. 30th St., N. Y.
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

MEDICINAL SOAPS, LIQUID (see POTASH SOAPS)

MENTHOL
(see also Essential Oils)

Allondon-Bayonne Co., 11 Park Place, N. Y.
S. W. Bridges & Co., 82 Wall St., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
P. R. Dreyer, 119 W. 19th St., N. Y.
Fritzsche Bros., Inc., 76 Ninth Ave., N. Y.
Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., N. Y.
A. Maschmeijer, Jr., Inc., 45 W. 16th St., N. Y.
McKesson & Robbins, Inc., 79 Cliff St., N. Y.
Mitsui & Co., 350—5th Ave., N. Y.
Norda Essential Oil & Chem. Co., 601 W. 26th St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
R. J. Prentiss & Co., 100 Gold St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Schimmel & Co., 601 W. 26th St., N. Y.
Sherka Chemical Co., 86 Orange St., Bloomfield, N. J.
S. Suzuki & Co., 230 Park Ave., N. Y.
Tombarel Prods., 9 E. 19th St., N. Y.

MERCURY BICHLORIDE (Corrosive Sublimate)
General Chem. Co., 40 Rector St., N. Y.
Heyden Chemical Corp., 50 Union Sq., N. Y.
Mallinckrodt Chemical Works, St. Louis
Merck & Co., Rahway, N. J.
New York Quinine & Chem. Wks., N. 11th & Berry Sts., Brooklyn
Chas. Pfizer & Co., 81 Maiden Lane, N. Y.
Wood Ridge Mfg. Co., Wood Ridge, N. J.

METAL CAPS (see CAPS, METAL)

METAL POLISH (see POLISH)

METAL RECEPTACLES (Waste Baskets, Spittoons, etc., Garbage Pails & Barrels)

Justrite Mfg. Co., 2061 N. Southport Ave., Chicago
F. H. Lawson Co., Cincinnati
National Enameling & Stamping Co., Milwaukee, Wisc.
Solar Receptacle Co., Melrose Park, Ill.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
Wheeling Corrugating Co., Wheeling, W. Va.
Witt Cornice Co., 2118 Winchell Ave., Cincinnati

METALLIC SOAPS (see STEARATES)

METERS (see INSTRUMENTS)

METHYL ANTHRANILATE
(see also Aromatic Chemicals)

Dow Chemical Co., Midland, Mich.
E. I. Du Pont de Nemours, Wilmington, Del.
Givaudan-Delawanna, Inc., 330 W. 42nd St., N. Y.
Florasynth Labs., Olmstead & Starling Aves., N. Y.
A. Maschmeijer, Jr., Inc., 45 W. 16th St., N. Y.

METHYL CELLULOSE

Dow Chemical Co., Midland, Mich.
Hercules Powder Co., Wilmington, Del.
General Dyestuffs, 230—5th Ave., N. Y.

METHYL SALICYLATE (Artificial Wintergreen)
(see also Aromatic Chemicals)

Dow Chemical Co., Midland, Mich.
Givaudan-Delawanna, Inc., 330 W. 42nd St., N. Y.
Heyden Chemical Corp., 50 Union Sq., N. Y.
Merck & Co., Rahway, N. J.
Monsanto Chemical Works, 1724 S. 2nd St., St. Louis

MILLS, COLLOID (See Colloid Mills)

MILLS, SOAP POWDER (see SOAP MACHINERY & GRINDING MACHINERY)

MILLS, TOILET SOAP (see SOAP MACHINERY)

MINERAL OIL, WHITE, see WHITE MINERAL OIL

MINERAL SOAP STOCK, see PETROLATUM

MIRBANE OIL (Nitrobenzene)
(see also Essential Oils)

Calco Chemical Co., Bound Brook, N. J.
E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
Merck & Co., N. Y.
Monsanto Chemical Works, 1724 S. 2nd St., St. Louis
National Aniline & Chemical Co., 40 Rector St., N. Y.
Naugatuck Aromatics, Inc., 12 E. 12th St., N. Y.

MIXERS (Portable)

Alsop Engineering Corp., 100 High St., Milldale, Conn.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Products Co., 15 Park Row, N. Y. (Used)
Eastern Engineering Co., 45 Fox St., New Haven, Conn.
Ertel Eng. Co., Kingston, N. Y.
Filter Paper Co., 57 E. 24th St., Chicago
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259—46th St., Brooklyn
Frank B. Lomax Co., 365 W. Oak St., Chicago
Mixing Equipment Co., Inc., 1067 Garson Ave., Rochester, N. Y.
Patterson Fdy. & Mch. Co., E. Liverpool, O.
Pfaudler Co., 89 East Ave., Rochester, N. Y.
Read Machy. Co., York, Pa.

MIXING MACHINERY (Change Can)

Abbe Engineering Co., 50 Church St., N. Y.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Arthur Colton Co., Detroit, Mich.
Consolidated Products Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
Houchin Machy. Co., Hawthorne, N. J.
Huber Machine Co., 259—46th St., Brooklyn
Kent Machine Works, 39 Gold St., Brooklyn
Mixing Equipment Co., Inc., 1067 Garson Ave., Rochester, N. Y.
Patterson Foundry & Mch. Co., E. Liverpool, Ohio
Read Machy., Co., York, Pa.
Chas. Ross & Son Co., 150 Classon Ave., Brooklyn
Waterville Fndry. & Machine Co., Waterville, N. Y.

MIXING MACHINERY (Dry Products)

Abbe Engineering Co., 50 Church St., N. Y.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Products Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
B. F. Gump Co., 431 S. Clinton St., Chicago
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259—46th St., Brooklyn
Lancaster Iron Works, Lancaster, Pa.
Prater Pulverizing Co., 1829 S. 55th Ave., Chicago
Read Machy. Co., York, Pa.

MIXING EQUIPMENT COMPANY, INC.

1067 GARSON AVENUE — ROCHESTER, N. Y.

LIGHTNIN

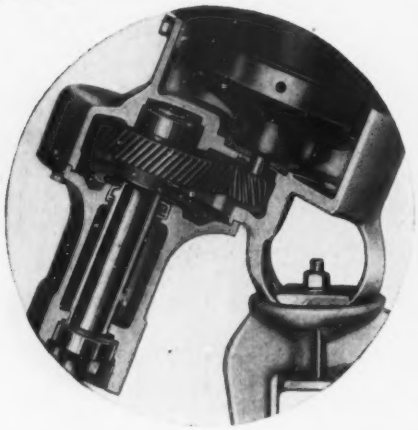
WM. & J. G. GREEY CO., LTD.

Canadian Licensees, Manufacturing and Sales Representative in all Principal Industrial Cities

LIGHTNIN

Use Classified Phone Directory
Reg. U. S. A.

Cable Address: MIXCO
Reg. U. S. A.

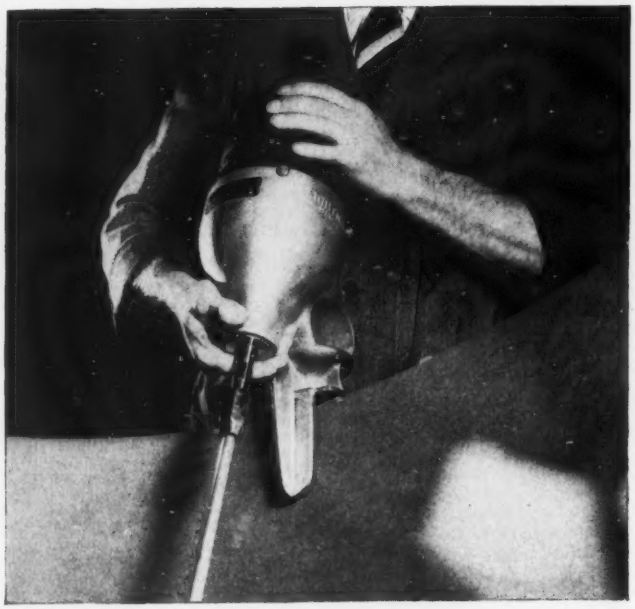


SEALED GEAR HOUSING

KEEPS DIRT OUT, LUBRICANT IN

This improved construction removes danger of mixer gears running dry and wearing out. Insures added years of service because gears are always properly lubricated. Prevents leakage. Cuts down maintenance to semi-annual or annual servicing.

Pre-lubricated sealed ball bearings, an exclusive "LIGHTNIN" feature, protect both your mixer and your product. Dirt and grit cannot get into the bearing or working mechanism—grease cannot get out.



NEW HAND CLAMP (At Right)

Convenient new hand clamp permits positioning of mixers to any desired angle without use of wrenches. Retains all desirable features of ball and socket clamp. Exclusive patented double wedge with hand wheel tightens unit more firmly and rigidly and cannot work loose. Wedge cannot rust or "freeze." Can be installed on your present "LIGHTNIN" Mixer. Write for prices on clamping kit.

Regardless of shape, size, or material, you can make a complete mixing unit out of any tank or vessel in your plant with a "LIGHTNIN" Propeller Type Mixer.

STURDY, POWERFUL "LIGHTNIN" MIXERS REDUCE COSTS ON

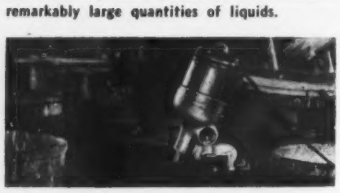
Agricultural Insecticides
Anti-Freeze Products
Antiseptics
Cleaning Fluids
Deodorizing Products
Disinfectants
Floor Products
Germicides
Glycerin
Household Ammonia
Laundry Bleach
Liquid Scrub Soap
Liquid Soap
Moth Products
Oil Soap
Polishes
Theatre Sprays
Stock Sprays and Dips

PORTABLES

"LIGHTNIN" GEAR DRIVE MIXERS (¼ to 10 H. P.) operating at low speed (400 R.P.M.) are generally recommended for fairly viscous liquids, ranging from 500 to 4,000 centipoises, especially efficient for mixing liquid soaps, glycerin, polishes, light waxes, etc. All gears are "sealed in grease." We have run mixers over 17,000 hours continuous duty (equivalent to 10 years' average service), with no attention whatsoever, with no perceptible wear on parts.

"LIGHTNIN" DIRECT DRIVE PORTABLES (⅛ to 10 H. P.) are recommended for lighter liquids, dissolving materials or suspending solids.

Operating at a propeller speed of 1,150 or 1,750 R.P.M., these versatile mixers can mix remarkably large quantities of liquids.



FOR MIXING LARGE QUANTITIES OR TO MEET SPECIAL CONDITIONS

"LIGHTNIN" TRIPOD MIXERS

These top entering units are built for closed tank, vacuum or pressure work. Geared or direct drive. Built for heavy duty service.

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Are available in four different types in sizes from 1/3 to 25 H. P., geared for direct drive, corrosion resistant and motorless styles. Ruggedly built.

Send for this New "LIGHTNIN" Literature. You need it to keep up to date on mixing.

Bulletin B-66—Side Entering Units
Bulletin B-65—Portable Mixers
Bulletin B-68—Top Entering Units
Bulletin B-67—Laboratory Mixers
MIXING PROBLEM WORK SHEET, Mi-11

MIXING MACHINERY (Dry Products) (Contd.)

Robinson Mfg. Co., Muncy, Pa.
Chas Ross & Son Co., 150 Classon Ave., Brooklyn
Sprout Waldron & Co., Muncy, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
F. J. Stokes Machine Co., Philadelphia, Pa.
Struthers-Wells Corp., Warren, Pa.
Aurelio Tanzi Engineering Co., 430 Jefferson St., Bklyn.

MIXING MACHINERY (General)

Alsop Engineering Corp., 100 High St., Milldale, Conn.
Baker-Perkins Co., 250 Park Ave., N. Y.
Beach-Russ Co., 50 Church St., N. Y.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Arthur Colton Co., Detroit
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
Eastern Engineering Co., 45 Fox St., N. Y.
Edge Moor Iron Wks., 30 Rockefeller Plaza, N. Y.
Filter Paper Co., 57 E. 24th St., Chicago
B. F. Gump Co., 431 S. Clinton St., Chicago
Houchin Machinery Co., Hawthorne, N. J.
S. Howes Co., Inc., Silver Creek, N. Y.
Huber Machine Co., 259—46th St., Brooklyn
Kent Machine Works, 37 Gold St., Brooklyn
Lancaster Iron Works, Lancaster, Pa.
Alan Porter Lee, 136 Liberty St., N. Y.
J. M. Lehmann Co., 248 West Broadway, N. Y.
Littleford Bros., 443 E. Pearl St., Cincinnati
Mixing Equipment Co., 1067 Garson Ave., Rochester, N. Y.
Patterson Foundry & Mach. Co., East Liverpool, Ohio
Pfaudler Co., 89 East St., Rochester, N. Y.
Prater Pulverizing Co., 1829 S. 55th Ave., Chicago
Read Machinery Co., York, Pa.
Robinson Mfg. Co., Muncy, Pa.
Chas. Ross & Son Co., 150 Classon Ave., Brooklyn
Sowers Mfg. Co., 1296 Niagara St., Buffalo, N. Y.
Sprout Waldron & Co., Muncy, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
F. J. Stokes Mach. Co., Philadelphia, Pa.
Struthers-Wells Co., Warren, Pa.
Turbo Mixer Corp., 247 Park Ave., N. Y.
Waterville Foundry & Machine Co., Waterville, N. Y.

MIXING TANKS (see TANKS, WOODEN, STEEL and GLASS, MIXING)

MONEL METAL EQUIPMENT

Eastern Engineering Co., 45 Fox St., New Haven, Conn. (Pumps)
Edge Moor Iron Wks., 30 Rockefeller Plaza, N. Y.
Houchin Machinery Co., Hawthorne, N. J.
International Nickel Co., 67 Wall St., N. Y.
Alan Porter Lee, Inc., 136 Liberty St., N. Y.
Littleford Bros., 453 E. Pearl St., Cincinnati
Pfaudler Co., 89 East St., Rochester, N. Y.
Sprout Waldron & Co., Muncy, Pa.
F. J. Stokes Machine Co., Phila.
Wurster & Sanger, Inc., 5201 Kenwood Ave., Chicago

MONOCHLORBENZENE (see SOLVENTS, ORGANIC)

MONTAN WAX (see WAXES)

MOP HANDLES

Algoma Mfg. Co., Green Bay, Wis.
Amer. Standard Mfg. Co., 2509 S. Green St., Chicago
Stanley H. Coffin, 12 Pearl St., Boston
Continental Car-Na-Var Corp., Brazil, Ind.
Eagle Woodenware Mfg. Co., Hamilton, O.
Economy Mop Wringer Co., 1944 W. 21st St., Chicago
Erie Mop & Wringer Co., East Rochester, N. Y.
Howard Dustless Duster Co., Boston
W. E. Kautenberg Co., Freeport, Ill.
Massasoit Mfg. Co., 8 White St., N. Y.
Rubon Wood Finishing & Prods. Co., 500 W. 7th St., Kansas City, Mo.
Silver-Chamberlin Co., Clayton, N. Y.
White Mop Wringer Co., Fultonville, N. Y.

MOP WRINGERS AND PAILS

Stanley H. Coffin, 12 Pearl St., Boston
Colson Mfg. Co., Elyria, O.
Dobbins Mfg. Co., North St. Paul, Minn.
Eagle Woodenware Mfg. Co., Hamilton, Ohio
Economy Mop Wringer Co., 1944 W. 21st St., Chicago
Geuder, Paesche & Frey, Milwaukee, Wis.
Illinois Duster Co., 1944 Webster Ave., Chicago
S. C. Lawlor Co., 124 N. Curtis St., Chicago
Muskegon Sanitary Supply Co., Muskegon Heights, Mich.
Palmer Prods., Inc., Waukesha, Wis.
Sanitary Mfg. Co., 926 Ft. Wayne Ave., Indianapolis
Sweet Mop Co., 1913 Fremont Ave., South Pasadena, Cal.
Tarbox Lever Corp., 61 Chandler St., Buffalo
White Mop Wringer Co., Fultonville, N. Y.

MOPPING TANKS AND TRUCKS

Eagle Woodenware Mfg. Co., Hamilton, O.
Economy Mop Wringer Co., 1944 W. 21st St., Chicago
S. C. Lawlor Co., 124 N. Curtis St., Chicago
Palmer Prods., Inc., Waukesha, Wis.
White Mop Wringer Co., Fultonville, N. Y.

MOPS

Alabama Broom & Mattress Co., Huntsville, Ala.
Algoma Mfg. Co., Green Bay, Wis.
Amer. Standard Mfg. Co., 2509 S. Green St., Chicago
Burdett-Rose Mfg. Co., 6100 Independence Rd., Kansas City, Mo.
California Cotton Mills Co., Oakland, Calif.
Chattanooga Broom & Mop Co., Chattanooga, Tenn.
Clark Bros. Mfg. Co., 34 N. Front St., Phila.
Stanley H. Coffin, 12 Pearl St., Boston, Mass.
Continental Car-Na-Var Corp., Brazil, Ind.
Eagle Woodenware Mfg. Co., Hamilton, O.
Howard Dustless Duster Co., Boston, Mass.
W. E. Kautenberg Co., P. O. Box 255, Freeport, Ill.
Klenzall Mfg. Co., Atlanta, Ga.
Palmer Prods., Inc., Waukesha, Wis.
Pioneer Mfg. Co., Cleveland, Ohio
Rubon Woodfinishing & Prod. Co., 500 W. 7th St., Kansas City, Mo.
Sanitary Mfg. Co., 926 Ft. Wayne Ave., Indianapolis
Schaefer-Wetcher Co., 445 W. Jefferson Ave., Detroit
Silver-Chamberlain Co., Clayton, N. J.
T. C. Smyth Mfg. Co., Union City, Ind.
Sweet Mop Co., 1913 Fremont Ave., South Pasadena, Cal.
Tate Mfg. Co., Boston, Mass.
M. J. Toohey & Co., Fall River, Mass.
Tuscaloosa Mills, Tuscaloosa, Ala.
Tu-Way Products Co., 445 W. Jefferson Ave., Detroit, Mich.
Yocma Mills, Water Valley, Miss.

MOSQUITO LARVICIDE

Ampion Corp., 4-88—47th Ave., L. I. City, N. Y.
Baird & McGuire, Inc., Holbrook, Mass.
Baird & McGuire of Mo., St. Louis
Cary Mfg. Co., Joliet, Ill.
Cenol Co., 4250 N. Crawford Ave., Chicago
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
Crystal Soap & Chem. Co., 6300 State Rd., Philadelphia
Eagle Soap Corp., Huntington, Ind.
Fuld Bros., 702 S. Wolfe St., Baltimore
Hockwald Chem. Co., 135 Mississippi St., San Francisco
James Huggins & Son, 239 Medford St., Malden, Mass.
Hunt Mfg. Co., Lisbon Rd., Cleveland
McCormick & Co., Inc., Baltimore, Md.
Merck & Co., Rahway, N. J.
Palmer Prods., Inc., Waukesha, Wis.
Peck's Products Co., St. Louis
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
Thompson-Hayward Chemical Co., 2915 Southwest Blvd., Kansas City, Mo.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
White Tar Co., Kearny, N. J.

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MOTH BAGS

Amer. Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Clopay Co., Cincinnati
Kennedy Car Liner Co., Indianapolis
LeMontre Co., Cincinnati
Rosette Co., 200 Tillary St., Brooklyn
White Tar Co., Kearny, N. Y.

MOTH PROOFING COMPOUNDS

American Cyanamid & Chemicals Corp., 30 Rockefeller Plaza, N. Y.
Ampion Corp., 4-88—47th Ave., L. I. City, N. Y.
Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
Barrett Co., 40 Rector St., N. Y.
Baird & McGuire, Inc., Holbrook, Mass.
Baird & McGuire, Inc., of Mo., St. Louis
Cenol Co., 4250 N. Crawford Ave., Chicago
Chemical Supply Co., 2450 Canal Rd., Cleveland
Delta Chemical Co., 4 Payson Ave., N. Y.
E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
Edelman Co., 6249 S. St. Lawrence Ave., Chicago
Fuld Bros., Inc., 702 S. Wolfe St., Baltimore
General Dyestuffs Corp., 435 Hudson St., N. Y.
R. W. Greeff & Co., 10 E. 40th St., N. Y.
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Hooker Electrochemical Co., Niagara Falls, N. Y.
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Maywood Pest Exterminators, 1413 Washington Blvd., Maywood, Ill.
Merck & Co., Rahway, N. J.
Midway Chemical Co., 5235 W. 65th St., Chicago
Peck's Products Co., St. Louis
Penna. Salt Mfg. Co., 1000 Widener Bldg., Phila.
John Powell & Co., 114 E. 32nd St., N. Y.
Reilly Tar & Chemical Corp., Indianapolis
Reliable Chemical Co., P. O. Box 361, Passaic, N. J.
Solvay Sales Corp., 40 Rector St., New York
Trojan Products & Mfg. Co., 3130 S. Wabash Ave., Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Joseph Turner Co., Ridgefield, N. J.
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
U. S. Sanitary Spec. Corp., 435 S. Western Ave., Chicago
White Tar Co., Kearny, N. J.
Whitmire Research Corp., 339 S. Vandeventer, St Louis

MOTH SPRAYS (see HOUSEHOLD INSECTICIDES, LIQUID)

MOTTLED SOAPS

Hewitt Soap Co., Dayton, O.
Lightfoot Schultz Co., Hoboken, N. J.
Los Angeles Soap Co., Los Angeles
National Soap Co., P. O. Box 1613, Tacoma, Wash.
Peck's Prods. Co., 5224 N. 2nd St., St. Louis
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
John T. Stanley Co., 642 W. 30th St., N. Y.
M. Werk Co., Cincinnati, O.
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

MOUSE SEEDS (see POISONED SEEDS)

MUSKS, ARTIFICIAL (see AROMATIC CHEMICALS)

MYRISTIC ACID (See also FATTY ACIDS)

Woburn Degreasing Co. of N. J., 12000 Harrison Ave., Harrison, N. J.

NAPHTHA (see SOLVENT NAPHTHA)

NAPHTHALENE

American-British Chem. Supplies, Inc., 180 Madison Ave., N. Y.
Barrett Co., 40 Rector St., N. Y.
S. H. Bell Co., 1407 Gulf Bldg., Pittsburgh
Dominion Tar & Chem. Co., Ltd., 430 Canada Cement Bldg., Montreal.
E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
William E. Jordan & Bro., 2590 Atlantic Ave., Brooklyn
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
Neville Co., Pittsburgh
Reilly Tar & Chem. Corp., Indianapolis
Republic Chemical Co., 94 Beekman St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Standard Naphthalene Prods. Co., Jacobus Ave., S. Kearny, N. J.
White Tar Co., Kearny, N. J.

NAPHTHALENE SULFONATES

E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del
General Dyestuffs Corp., 435 Hudson St., N. Y.
National Aniline & Chem. Co., 40 Rector St., N. Y.
L. Sonneborn Sons, 88 Lexington Ave., N. Y.

NAPHTHENIC ACIDS (and Sulfonic Sludges)

Advance Solvents & Chem. Co., 245—5th Ave., N. Y.
Atlantic Refining Co., 260 S. Broad St., Philadelphia
General Petroleum Corp. of Calif., 108 W. 2nd St., Los Angeles
Hummel Chem. Co., 90 West St., N. Y.
Nuodex Prods. Co., Elizabeth, N. J.
Pennsylvania Refining Co., Butler, Pa.
Petroleum By-Products Co., 15 Whitehall St., N. Y.
Petroleum Specialties, Inc., 570 Lexington Ave., N. Y.
S. Schwabacher & Co., 570 Lexington Ave., N. Y.
Shell Petroleum Corp., Shell Bldg., St. Louis
L. Sonneborn Sons, 88 Lexington Ave., N. Y.

NEROLI OIL (Artificial) (see METHYL ANTHRANILATE)

NICKEL-CLAD EQUIPMENT (see also SOAP MACHINERY)

Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Edge Moor Iron Wks., 30 Rockefeller Plaza, N. Y.
Houchin Machinery Co., Hawthorne, N. J.
International Nickel Co., 67 Wall St., N. Y.
Alan Porter Lee, Inc., 136 Liberty St., N. Y.
Littleford Bros., 453 E. Pearl St., Cincinnati
Lukens Steel Corp., Coatesville, Pa.
F. J. Stokes Machine Co., Philadelphia
Wurster & Sanger, Inc., 5201 S. Kenwood Ave., Chicago

NICOTINE COMPOUNDS

E. I. Du Pont de Nemours, Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Hood River Spray Co., Hood River, Ore.
Kemiko Mfg. Co., 500 Chancellor Ave., Irvington, N. J.
Sanocide Spray Co., Fennville, Mich.
Tobacco By-Products & Chem. Corp., Columbia Bldg., Louisville, Ky.

NITRE CAKE

Amer. Cyanamid & Chem. Co., 30 Rockefeller Plaza, N. Y.
E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Chas. Lennig & Co., 222 W. Washington Sq., Philadelphia
Monsanto Chemical Co., 1724 S. 2nd St., St. Louis
Rohm & Haas Co., 222 W. Washington Sq., Phila.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.

NON-SOAP DETERGENTS (see Detergents, Synthetic)

NOVELTY SOAPS

Armour & Co., 1355 W. 31st St., Chicago
Illustrated Soap Co., 151 W. 25th St., N. Y.
Lightfoot Schultz Co., 1412 Park Ave., Hoboken, N. J.
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
John T. Stanley Co., 642 W. 30th St., N. Y.
Unique Soaps, P. O. Box No. 61, Covington, Ky.
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

ODORLESS KEROSENE (see Petroleum Base, Deodorized)

OIL HYDROGENATION PLANTS

William Garrigue Co., 9 S. Clinton St., Chicago
Alan Porter Lee, 136 Liberty St., N. Y.
Robinson, Butler, Hemingway & Co., Box 371, Bound Brook, N. J.
Struthers Wells Titusville Corp., Warren, Pa.
Wurster & Sanger, Inc., 5201 S. Kenwood Ave., Chicago

OIL MILL EQUIPMENT

V. D. Anderson Co., 1935 W. 96th St., Cleveland
Bauer Bros. Co., Springfield, O.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Albert Bruecke, P. O. Box 266, Englewood, N. J.
Buckeye Iron & Brass Works, Dayton, O.
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
French Oil Mill Mach. Co., Piqua, O.
William Garrigue Co., 9 S. Clinton St., Chicago
Alan Porter Lee, Inc., 136 Liberty St., N. Y.
Robinson, Butler, Hemingway Co., Bound Brook, N. J.
Ernest Scott & Co., Fall River, Mass.
Sprout Waldron & Co., Muncy, Pa.
Struthers-Wells Co., Warren, Pa.
Wurster & Sanger, Inc., 5201 S. Kenwood Ave., Chicago

OIL SOAP (see POTASH SOAPS)

OLEIC ACID (see RED OIL)

OLIVE OIL (Commercial)
(see also Brokers and Dealers)

Irving R. Boody & Co., 99 Wall St., N. Y.
T. G. Cooper & Co., 47 N. 2nd St., Phila.
Eastern Industries, Inc., Ridgefield, N. J.
W. R. Grace & Co., 7 Hanover Sq., N. Y.
Leghorn Trading Co., 21 West St., N. Y.
Francisco Martin, 80 Wall St., N. Y.
J. H. Redding Co., 17 Battery Pl., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.
Smith-Weihman Co., 15 Moore St., N. Y.
Tombarel Prods. Corp., 9 E. 19th St., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

OLIVE OIL FOOTS
(see also Brokers and Dealers)

T. G. Cooper & Co., 47 N. 2nd St., Philadelphia
Eastern Industries, Inc., Ridgefield, N. J.
Leghorn Trading Co., 21 West St., N. Y.
J. H. Redding Co., 17 Battery Pl., N. Y.
E. M. Sergeant Pulp & Chem. Co., Empire State Bldg., N. Y.
Smith-Weihman Co., 15 Moore St., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

OLIVE OIL SOAPS (see CASTILE SOAPS, TEXTILE SOAPS)

ORANGE OIL (see ESSENTIAL OILS)

ORTHODICHLORBENZENE (see PARADICHLORBENZENE)

OXALIC ACID
(see also Dealers)

Amer. Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
Faesy & Besthoff, Inc., 22 E. 40th St., N. Y.
General Chemical Co., 40 Rector St., New York
Innis, Speiden & Co., 117 Liberty St., N. Y.
Mallinckrodt Chemical Wks., St. Louis, Mo.
Merck & Co., Rahway, N. J.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
E. M. Sergeant Pulp & Chemical Co., 350 Fifth Ave., N. Y.
Tamms Silica Co., 228 N. La Salle St., Chicago
Jos. Turner & Co., Ridgefield, N. J.
Victor Chemical Works, 141 W. Jackson Blvd., Chicago

PACKAGING MACHINERY (see CARTONING MACHY., FILLING MACHY., WEIGHING EQUIP., WRAPPING MACHY.)

PAILS (Fibre) (see BARRELS, FIBRE)

PAILS (Steel)

American Can Co., 230 Park Ave., N. Y.
Bennett Mfg. Co., 14600 Princeton Ave., Chicago
Cans, Inc., 321 W. Ohio St., Chicago
Central Can Co., 2415 W. 19th St., Chicago
Fein's Tin Can Co., Bush Terminal, Brooklyn
Geuder, Paeschke & Frey Co., Milwaukee
National Can Co., 110 E. 42nd St., N. Y.
National Steel Barrel Co., 3860 E. 91st St., Cleveland
Pittsburgh Can Co., Pittsburgh, Pa.
Pressed Steel Tank Co., 5717 Greenfield Ave., Milwaukee, Wis.
F. C. Thornton Co., 6712 Union Ave., Cleveland
John Trageser Steam Copper Works, Grand Ave., Maspeth, L. I., N. Y.
Vulcan Stamping & Mfg. Co., 4036 W. Lake St., Chicago
Wheeling Corrugating Co., Wheeling, W. Va.
Wilson & Bennett Mfg. Co., 6532 S. Menard Ave., Chicago

PAILS (Wooden)

Beaver Mills, Keene, N. H.
Eagle Woodenware Mfg. Co., Hamilton, O.
Gambrinus Cooperage Works, 930 Mason St., Louisville, Ky.
Impervious Package Co., Keene, N. H.
Menasha Woodenware Co., Menasha, Wis.
Richmond Cedar Works, Richmond, Va.

PALM KERNEL OIL
(see also Brokers and Dealers)

Balfour Guthrie & Co., 67 Wall St., N. Y.
Irving R. Boody & Co., 99 Wall St., N. Y.
Durkee Famous Foods, Inc., 2670 Elston Ave., Chicago
Spencer Kellogg & Sons., Buffalo, N. Y.
Pacific Vegetable Oil Corp., 62 Townsend St., San Francisco, Calif.
J. H. Redding Co., 17 Battery Pl., N. Y.
Smith-Weihman Co., 15 Moore St., N. Y.
Zimmerman Alderson Carr Co., 25 Broadway, N. Y.

PALM OIL
(see also Brokers and Dealers)

Balfour, Guthrie & Co., 67 Wall St . N. Y.
T. G. Cooper & Co., 47 N. 2nd St., Phila.
Eastern Industries, Ridgefield, N. J.
J. H. Redding Co., 17 Battery Pl., N. Y.
Smith-Weihman Co., 15 Moore St., N. Y.
Stein, Hall & Co., 285 Madison Ave., N. Y. (Sumatra)
Wecoline Products, Inc., 15 E. 26th St., New York
Zimmerman Alderson Carr Co., 25 Broadway, N. Y.

PAPER CANS (see CANS)

PAPER (Corrugated) (see BOXES, CORRUGATED)

PAPER CUPS

F. N. Burt Co., Batavia, N. Y.
Individual Drinking Cup Co., Easton, Pa.
Sutherland Paper Co., Kalamazoo, Mich.
Vortex Mfg. Co., 430 N. Western Ave., Chicago

PAPER (Fancy Wrapping)

Aluminum Co. of America, Gulf Bldg., Pittsburgh
Beekman Paper & Card Co., 137 Varick St., N. Y.
A. M. Collins Mfg. 1518 Walnut St., Phila.
Louis Dejonge & Co., 155—6th Ave., N. Y.

PAPER (Fancy Wrapping) (Contd.)

C. J. Fox Co., 236 Abron St., Providence, R. I.
Fox Paper Co., Lockland, Cincinnati, O.
Hampden Glazed Paper & Card Co., Holyoke, Mass.
Henderson Lithographing Co., Cincinnati
Keller-Dorian Paper Co., 516 W. 34th St., N. Y.
New England Card & Paper Co., 10 Hanover St., Springfield, Mass.
Pictorial Package Co., Aurora, Ill.
Marquette Lithograph Co., 730 N. Franklin St., Chicago
Nashua Gummed & Coated Paper Co., Nashua, N. H.
Potomac Lithograph Mfg. Co., Washington, D. C.
Richardson Co., Lockland, O.
Geo. Schmitt & Co., 253 Maujer St., Brooklyn
Louis Schulman Co., 465 Broome St., N. Y.
Strobridge Lithographing Co., Norwood Station, Cincinnati
Sylvania Industrial Corp., 122 E. 42nd St., N. Y.
Tamm & Co., 66 Duane St., N. Y.
Transcello Paper Co., Milwaukee, Wisc.
U. S. Printing & Lithographing Co., Cincinnati, O.
Whiting-Paterson Co., Inc., 320—13th St., Philadelphia
Chas. W. Williams & Co., Inc., 309 Lafayette St., N. Y.

PAPER TOILET SEAT COVERS

Morton Mfg. Co., 5105 W. Lake St., Chicago
National Towel Bendon Ltd., 12 Stewart St., San Francisco
Sani-Gard Cover Co., 411 W. 5th St., Los Angeles

PAPER TOWELS and TISSUES

Brown Co., Portland, Me.
Hoberg Paper & Fibre Co., Green Bay, Wisc.
Scott Paper Co., Chester, Pa.
Straubel Paper Co., Green Bay, Wis.
U. S. Envelope Co., Lititz, Pa.
Victoria Paper Mills Co., Fulton, N. Y.

PARAFFIN

Atlantic Refining Co., 260 S. Broad St., Philadelphia
Borne-Scrymser Co., 17 Battery Pl., N. Y.
E. A. Bromund Co., 258 Broadway, N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago
Gulf Refining Co., Pittsburgh
Innis, Speiden & Co., 117 Liberty St., N. Y.
Lenape Trading Co., 225 Broadway, N. Y.
George H. Lincks, 123 Front St., N. Y.
Oil States Petroleum Co., 233 Broadway, N. Y.
Sherwood Petroleum Co., Englewood, N. J.
Sinclair Refining Co., 630—5th Ave., N. Y.
Smith & Nichols, 121 Maiden Lane, N. Y.
Standard Oil Co. (Calif.), 225 Bush St., San Francisco
Standard Oil Co., (Ind.) 910 S. Michigan Ave., Chicago
Standard Oil Co., (N. J.) 26 Broadway, N. Y.
Standard Oil Co., (Ohio) Midland Bldg., Cleveland
Strohmeyer & Arpe Co., 139 Franklin St., N. Y.
Texas Co., 135 E. 42nd St., N. Y.

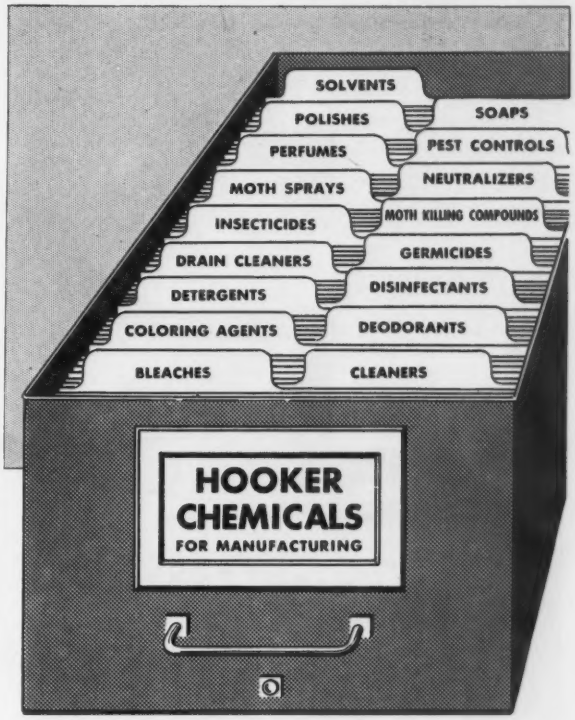
PARAFFIN OILS

Atlantic Refining Co., 260 S. Broad St., Philadelphia
Deep Rock Oil Corp., 155 N. Clark St., Chicago
Gulf Refining Co., Pittsburgh
Petroleum Specialties, Inc., 570 Lexington Ave., N. Y.
Sherwood Petroleum Co., Englewood, N. J.
Sinclair Refining Co., 630—5th Ave., N. Y.
Shell Petroleum Corp., Shell Bldg., St. Louis
Skelly Oil Co., 121 W. Wacker Drive, Chicago
L. Sonneborn Sons, Inc., 88 Lexington Ave., N. Y.
Standard Oil Co. (Calif.), 225 Bush St., San Francisco
Standard Oil Co. (Ind.), 910 S. Michigan Ave., Chicago
Standard Oil Co. (Ohio), Midland Bldg., Cleveland

PARA BLOCKS (see DEODORIZING BLOCKS)

PARADICHLORBENZENE

Delta Chemical Mfg. Co., 2101 Washington Blvd., Baltimore
Dow Chemical Co., Midland, Mich.



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Sherka Chemical Co., 86 Orange St., Bloomfield, N. J.

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PEACH KERNEL OIL (see ESSENTIAL OILS)

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(see also Brokers and Dealers)

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Welch, Holme & Clark, 563 Greenwich St., N. Y.

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Wurster & Sanger, Inc., 5201 S. Kenwood Ave., Chicago

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Norda Essential Oil & Chem. Co., 601 W. 26th St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
Polak's Frutal Wks., Inc., 36-14—35th St., L. I. City, N. Y.
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Rifa-New York, Inc., 153 Waverly Pl., New York
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Pennsylvania Ref. Co., Butler, Pa.
Pennzoil Co., Oil City, Pa.
Refiners Petroleum Co., 122 S. Mich. Blvd., Chicago
Shell Petroleum Corp., Shell Bldg., St. Louis
Sherwood Petroleum Co., Englewood, N. J.
Sinclair Refining Co., 630 Fifth Ave., N. Y.
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L. Sonneborn Sons, 88 Lexington Ave., N. Y.
Standard Oil Co. (Calif.), 225 Bush St., San Francisco
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Haag Laboratories, 6101 S. Mary St., Chicago
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Harrisburg Steel Corp., Harrisburg, Pa.
Hartford Tube Products Co., Hartford, Conn.
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Huber Machine Co., 259 46th St., Brooklyn
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., 4100 N. 5th St., Phila.
Pittsburgh Pipe Coil & Bending Co.,
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Rempe Co., 340 N. Sacramento Blvd., Chicago
Whitlock Coil Pipe Co., Hartford, Conn.

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Cole Chemical Co., 22-14—37th Ave., L. I. City, N. Y.
Creco Co., Creco Bldg., L. I. City, N. Y.
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Haag Laboratories, 6101 S. May St., Chicago
Harley Soap Co., Pierce & Orthodox Sts., Philadelphia
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
R. M. Hollingshead Corp., Camden, N. J.
Hubman Supply Co., 225 N. 4th St., Columbus, O.
Hull Co., 305 Washington St., Brooklyn
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Hysan Products Co., 2560 Armitage Ave., Chicago
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Kemiko Mfg. Co., 500 Chancellor Ave., Irvington, N. J.
J. S. Lawston Co., 8 Henshaw St., N. Y.
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
M & H Laboratories, 2703-5 Archer Ave., Chicago
Masury-Young Co., 76 Roland St., Boston
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Selig Co., 336 Marietta St., Atlanta, Ga.
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
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Standard Oil Co. (Ind.), 910 S. Michigan Ave., Chicago
Standard Oil Co. (Ohio), Midland Bldg., Cleveland
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H. F. Staples Co., Medford, Mass.
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Trojan Products & Mfg. Co., 3130 S. Wabash Ave.,
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J. A. Tumbler Labs., 423 Hanover St., Baltimore
Twin City Shellac Co., 340 Flushing Ave., Bklyn.
Twi-Laq Chemical Co., 25 No. Portland Ave., Brooklyn
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
U. S. Sanitary Specialties Corp.,
435 S. Western Ave., Chicago
V. C. Products Co., Philadelphia
Victory Chem. Co., 148 Fairmount Ave., Phila.
T. F. Washburn Co., 2244 Elston Ave., Chicago
Windsor Wax Co., 53 Park Pl., N. Y.

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(see also Dealers)

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Faesy & Besthoff, 22 E. 40th St., N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Niagara Alkali Co., 60 E. 42nd St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Warner Chemical Co., 405 Lexington Ave., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

POTASH SOAPS

American Soap & Washoline Co., Cohoes, N. Y.
Ampion Corp., 4-88—47th Ave., L. I. City, N. Y.
Antiseptol Co., 5524 Northwest Highway, Chicago
Armour Soap Wks., 1355 W. 31st St., Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Chemical Mfg. & Distrib. Co., Easton, Pa.
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
Cole Chemical Co., 22-14—37th Ave., L. I. City, N. Y.
James Counts Soap Co., 2nd & Washington Aves.,
St. Louis, Mo.
Creco Co., Creco Bldg., L. I. City, N. Y.
Crystal Soap & Chem. Co., 6300 State Road, Philadelphia
Cudahy Packing Co., 221 N. La Salle St., Chicago
Davies Young Soap Co., Dayton, Ohio
Eagle Soap Corp., Huntington, Ind.
J. Eavenson & Sons., Del. & Penn Sts., Camden, N. J.
A. C. Fergusson Co., Drexel Bldg., Phila.
Fuld Bros., 702 S. Wolfe St., Baltimore
Genseke Bros., W. 48th Pl. & Whipple St., Chicago, Ill.
James Good, Inc., 2116 E. Susquehanna Ave., Philadelphia
Haag Laboratories, Inc., 6101 S. May St., Chicago
Harley Soap Co., Pierce & Orthodox Sts., Philadelphia
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Holbrook Mfg. Co., Cole & 18th St., Jersey City
R. M. Hollingshead Corp., Camden, N. J.
Hubman Supply Co., 225 N. 4th St., Columbus, Ohio
Hysan Products Co., 2560 Armitage Ave., Chicago
Jansen Soap & Chemical Co., 324 Leavenworth St.,
San Francisco, Cal.
Kranich Soap Co., 54 Richards St., Brooklyn
Laurel Soap Mfg. Co., Tioga & Almond Sts., Philadelphia
Long Island Soap Co., Meeker Ave. &
Bridgewater St., Brooklyn
Los Angeles Soap Co., Los Angeles, Calif.
Masury-Young Co., 76 Roland St., Boston
Moore Bros. Co., 67 Vestry St., New York
National Oil Products Co., Harrison, N. J.
National Soap Co., 357 South 25th St., Tacoma, Wash.
North Coast Chem. & Soap Wks., Seattle, Wash.
Onalim Co., 2295 Second Ave., N. Y.
Palmer Prods., Inc., Waukesha, Wis.
Procter & Gamble Co., Cincinnati, O.
Puritan Soap Co., 573 Lyell Ave., Rochester, N. Y.
Theo. B. Robertson Prods. Co.,
700 W. Division St., Chicago
Rochester Germicide Co., Rochester, N. Y.
Royal Soap & Chem. Co., 511 S. Central Ave.,
Los Angeles
Rubon Woodfinishing & Prods. Co., 500 W. 7th St.,
Kansas City, Mo.
Sanitary Floor Compound Co., 104 Railroad Ave.,
Paterson, N. J.
Schaeffer Bros. & Powell Mfg. Co., 102 Barton St.,
St. Louis, Mo.
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
Standard Oil Co. (Ohio), Midland Bldg., Cleveland
John T. Stanley Co., 642 W. 30th St., N. Y.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
Thompson-Hayward Chemical Co., 2915 Southwest Blvd.,
Kansas City, Mo.
Tremco Mfg. Co., 393 East 131st St., Cleveland
Trojan Products & Mfg. Co., 3130 S. Wabash Ave.,
Chicago
J. A. Tumbler Labs., 423 Hanover St., Baltimore
U. S. Sanitary Specialties Corp., 435 S. Western Ave.,
Chicago
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
Chas. W. Young & Co., 1247 N. 26th St., Philadelphia

POTASSIUM CARBONATE

American Cyanamid & Chemicals Corp.,
30 Rockefeller Plaza, N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
E. I. du Pont de Nemours & Co., Wilmington, Del.
Faesy & Besthoff, 22 E. 40th St., N. Y.
Industrial Chem. Sales Div., West Va. Pulp & Paper Co.,
230 Park Ave., N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Harshaw Chem. Co., Cleveland
Niagara Alkali Co., 60 E. 42nd St., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

POTASSIUM PERSULFATE

American Cyanamid & Chemicals Corp.,
30 Rockefeller Plaza, N. Y.
Buffalo Elec. Chem. Co., River Rd. & Sawyer Ave.,
Buffalo
E. I. du Pont de Nemours & Co., Wilmington, Del.
Jungmann & Co., 157 Chambers St., N. Y.
E. M. Sergeant Pulp & Chemical Co.,
350 Fifth Ave., N. Y.
Jos. Turner & Co., Ridgefield, N. J.

POTASSIUM SILICATE

E. I. du Pont de Nemours & Co., Wilmington, Del.
Philadelphia Quartz Co., 125 S. 3rd St., Philadelphia

POWDER GUNS (see BELLOWS)

POWDERED SOAP (see SOAP, POWDERED) Do not confuse with SOAP POWDERS

PREMIUMS

Anchor Hocking Glass Corp., Lancaster, O. (glassware)
Goody Mfg. Co., 15 E. 22nd St., N. Y. (novelties)
Hazel-Atlas Glass Co., Wheeling, W. Va. (glassware)
Holgate Co., Kane, Pa. (woodenware toys)
Premium Service Co., 111 W. 19th St., N. Y. (all)
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(silks, etc.)

POWCO BRAND
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PYRETHRUM POWDERS with extremely fine milling to give you more particles per pound—greater spread with higher kill.

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Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Houchin Machinery Co., Hawthorne, N. J.
R. A. Jones & Co., Cincinnati, O.

PRESSES (Foot and Hand Lever for Soap and Para Cakes)

Brill Equipment Corp., 183 Varick St., (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259 46th St., Brooklyn
Newman Tallow & Soap Machy. Co., 1051 W. 35th St., Chicago
F. J. Stokes Mach. Co., Philadelphia, Pa.

PRIVATE FORMULAS (see under individual products)

PULVERIZERS (see GRINDING MACHINERY)

PUMICE STONE (see ABRASIVES and FILLERS)

PUMPS

Aldrich Pump Co., 1 Pine St., Allentown, Pa.
Alsop Engineering Corp., 100 High St., Milldale, Conn.
American Steam Pump Co., Battle Creek, Mich.
Beach-Russ Co., 50 Church St., N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
S. F. Bowser & Co., 1300 E. Creighton Ave., Ft. Wayne, Ind.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
M. T. Davidson Co., 154 Nassau St., N. Y.
Eastern Engineering Co., 45 Fox St., New Haven, Conn.
Filter Paper Co., 57 E. 24th St., Chicago
Foster Pumps, Inc., 51 Washington St., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259 46th St., Brooklyn
Ingersoll-Rand Co., 11 Broadway, N. Y.
Karl Kiefer Machine Co., 919 Martin St., Cincinnati
Lobee Pump & Machine Co., 129 Dearborn St., Buffalo, N. Y.
P. H. & F. M. Roots Co., Connersville, Ind.
Scientific Filter Co., 1 Franklin Square, N. Y.
T. Shriver & Co., Harrison, N. J.
F. J. Stokes Machine Co., Philadelphia, Pa.
Taber Pump Co., 278 Elm St., Buffalo, N. Y.
Viking Pump Co., Cedar Falls, Iowa
Worthington Pump & Machinery Co., 2 Park Ave., N. Y.

PYRETHRUM

Allaire Woodward & Co., Peoria, Ill.
An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Cal.
Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
Derris, Inc., 79 Wall St., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
Hammond Paint & Chemical Co., Beacon, N. Y.
J. L. Hopkins & Co., 220 Broadway, N. Y.
McCormick & Co., Baltimore, Md.
McLaughlin, Gormley King Co., 1715 Fifth St., S. E., Minneapolis, Minn.
S. B. Penick & Co., 132 Nassau St., N. Y.
John Powell & Co., 114 E. 32nd St., N. Y.
R. J. Prentiss & Co., 100 Gold St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.

PYRETHRUM EXTRACT

Allaire Woodward & Co., Peoria, Ill.
An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Cal.
Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
Dodge & Olcott Co., 180 Varick St., N. Y.
Hammond Paint & Chemical Co., Beacon, N. Y.
J. L. Hopkins & Co., 220 Broadway, N. Y.
McCormick & Co., Baltimore
McLaughlin Gormley King Co., 1715 Fifth St., S. E., Minneapolis

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The Purest Form of

STEARIC ACID

Specifications

	Titre	Iodine	F.F.A.	Color. Reading Yellow	Red
Single Pressed Stearic Acid Bead form Stearic Acid Cake form	52.2 to 53.0	10 to 15	103 to 104	10 max.	1.5 max.
Hi Test Single Pressed S. A. Cake or Beads	53.0 53.4	9 max.	103 104	6 max.	1.0 max.
Standard Double Pressed Cake or Beads	53.4 53.9	7 to 9	103 104	4 max.	0.8 to 1.0
Super Double Pressed Cake or Beads	53.9 54.3	5 to 7	103 104	3 max.	0.8 max.
Special Double Pressed Cake for Candle Mfg.	53.9 54.3	5 7	103 105	3 max.	0.8 max.
				Ash 0.004 max.	
Triple Pressed (Regular) Cake or Beads	54.5 53.8	4 max.	104 105	2 max.	0.5 max.
Triple Pressed (Super) *Cake or Beads (Crystal brand)	54.9 55.3	2 max.	104 105	1 max.	0.2 max.

*Large crystals.
Special quality stearic acid produced for buffing trade.

RED OIL

(Saponified and Distilled)

Specifications

	Titre	Iodine	F.F.A.	Color	Unsap.
Distilled R. O. (Reg. Grade)	10-12	92 max.	95-96	3½-4 NPA	3½-4
Distilled R. (Extra Quality)	8-10/10/12	90	97-98	2½-3½ NPA	3%
White Oleine (Redist. R/O)	10-12	90	99-100	1½ max. NPA	2%
Sap. Red Oil (Reg. Grade)	10-12	88-90	92-95	5-7 max. NPA	3% max.
Sap. Red Oil (Hi Titre)	34-38	.....	100-102	7 or darker	.....

(Also Dist. as above except color lighter)
Other grades of both Dist. & Sap. R/O blended to customers specifications or made on order to match samples as submitted.

DISTILLED FATTY ACIDS

Specifications

	Titre	F.F.A. min.	Iodine	Color	Unsap.
Distilled Corn Oil F.A.	24-26	98	95-110	3½ NPA max.	.....
Redistilled Corn Oil F.A.	26-28	100	100-110	2 NPA max.	.....
Distilled Cotton Oil F.A.	32-34	98	90-100	3½ NPA max.	.....
Redistilled Cotton Oil F.A.	34-36	100	90-100	2 NPA max.	.....
Distilled Coconut F.A.	18-22	128	9-15	2 NPA max.	.....
Distilled Veg. F.A. (VRO)	20-24	110	45-55	3 NPA max.	.....
Distilled Animal F.A.	38-42	102	50-60	2 NPA max.	.....
Distilled Roleic F.A.	32-36	100	44-50	3½ NPA max.	.....

HYDROGENATED FISH OIL FATTY ACID
VEGETABLE OILS AND FATTY ACIDS

CASTOR (Blown) COCOANUT OILS CORN | COTTONSEED HEMPSEED LINSEED | OLIVE PALM PALM KERNEL | PEANUT BLOWN OILS PERILLA | PINE POPPYSEED RICE BRAN | SESAME SOYA BEAN SUNFLOWER | TEASEED WALNUT ANIMAL OILS

PYRETHRUM EXTRACT (Contd.)

S. B. Penick & Co., 132 Nassau St., N. Y.
John Powell & Co., 114 E. 32nd St., N. Y.
R. J. Prentiss & Co., 100 Gold St., N. Y.

RAPESEED OIL

Balfour, Guthrie & Co., 67 Wall St., N. Y.
Irving R. Boody & Co., 99 Wall St., N. Y.
T. G. Cooper & Co., 47 N. 2nd St., Philadelphia
Pacific Vegetable Oil Corp., 62 Townsend St., San Francisco
J. H. Redding, Inc., 17 Battery Pl., N. Y.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland
Smith-Weihman Co., 15 Moore St., N. Y.
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Arthur C. Trask Co., 4103 S. La Salle St., Chicago
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

RAT EXTERMINATING PRODUCTS

American Fluoride Corp., 151 W. 19th St., N. Y.
An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Calif.
Associated Chemists, Inc., 6243 S. Ashland Ave., Chicago
Cenol Co., 4250 N. Crawford Ave., Chicago
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Cole Chemical Co., 22-14—37th Ave., L. I. City, N. Y.
Delta Chem. Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Exterminating Materials Co., 555 W. 22nd St., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
Goulard & Olena, Inc., 140 Liberty St., N. Y.
Foote Mineral Co., 1609 Summer St., Philadelphia
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Hysan Products Co., 2560 Armitage Ave., Chicago
Innis, Speiden & Co., 117 Liberty St., N. Y.
Lethelin Products Co., Mt. Vernon, N. Y.
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Calif.
Maywood Pest Exterminators, 1413 Washington Blvd., Maywood, Ill.
John Opitz, Inc., Long Island City, N. Y.
Pfaltz & Bauer, Inc., 350 Fifth Ave., N. Y.
Ratin Laboratories, Inc., 112 Broad St., N. Y.
Sennewald Drug Co., 2723 Chouteau Ave., St. Louis
Shores Co., Cedar Rapids, Iowa
Soilicide Laboratories, Upper Montclair, N. J.
Sur-Rid Prods. Co., 455 Paul Brown Bldg., St. Louis
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
Victory Chem. Co., 148 Fairmount Ave., Phila.

RAT POISONS (see SQUILLS, THALLIUM SULFATE, etc.)

RED OIL (Oleic Acid)
(see also Brokers and Dealers)

American British Chem. Supplies, Inc., 180 Madison Ave., N. Y.
American Cyanamid & Chemicals Corp., 30 Rockefeller Plaza, N. Y.
Armour & Co., 1355 W. 31st St., Chicago
Celina Stearic Acid Co., Celina, Ohio
Century Stearic Acid Candle Works, 22 E. 40th St., N. Y.
Darling & Co., 4201 S. Ashland Ave., Chicago
Eastern Industries, Ridgefield, N. J.
Emery Industries, Inc., 4300 Carew Tower, Cincinnati
A. Gross & Co., 122 E. 42nd St., N. Y.
W. C. Hardesty Co., 41 E. 42nd St., N. Y.
Harkness & Cowing, Ivorydale, Cincinnati
Procter & Gamble Co., Cincinnati
Theobald Industries, Kearny, N. J.
Arthur C. Trask Co., 4108 S. La Salle St., Chicago
Wecoline Products, Inc., 15 E. 26th St., N. Y.
M. Werk Co., St. Bernard, Cincinnati
Wilson-Martin Co., Snyder Ave. & Swanson St., Philadelphia

W. C. HARDESTY CO., Inc.

41 East 42nd Street **New York, N. Y.**

RED OIL STEARIC ACID

Saponified - Distilled

HYDROGENATED FATTY ACIDS (HYDREX)

Cottonseed Oil Fatty Acids **Coconut Oil Fatty Acids**
Palm Oil Fatty Acids **Corn Oil Fatty Acids**
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Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
William Garrigue & Co., 9 S. Clinton St., Chicago
Alan Porter Lee, Inc., 136 Liberty St., N. Y.
Lancaster Iron Works, 564 S. Prince St., Lancaster. Pa.
Ernest Scott & Co., Fall River. Mass.
Walter E. Simmons Co., Boston
Struthers-Wells Co., Warren, Pa.
Swenson Evaporator Co., Harvey, Ill.
Wurster & Sanger, Inc., 5201 S. Kenwood Ave., Chicago

REFRIGERATING EQUIPMENT

York Ice Machine Co., York. Pa.

REMELTERS

Consolidated Products Co., 15 Park Row, N. Y. (Used)
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259 46th St., Brooklyn
Lancaster Iron Works, 564 S. Prince St., Lancaster, Pa.
Alan Porter Lee, 136 Liberty St., N. Y.
Patterson Foundry & Mach. Co., East Liverpool, O.
Struthers-Wells Co., Warren, Pa.
Wurster & Sanger, Inc., 5201 Kenwood Ave., Chicago

RESINS, SYNTHETIC

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Bakelite Corp., 240 Park Ave., N. Y.
General Electric Co., Bridgeport, Conn.
Durez Plastics, Inc., North Tonawanda, N. Y.
Paramet Chem. Corp., 44th Ave. & 10th St., L. I. City
Reichhold Chemicals, Inc., Detroit
Resinous Prods. & Chem. Corp., 222 W. Washington Sq., Phila.
Stroock & Wittenberg Corp., Lincoln Bldg., N. Y.

RESPIRATORS

Davis Emergency Equipment Co., 55 Vandam Ave., New York
Mine Safety Appliances Co., Braddock and Thomas Sts., Pittsburgh

RHODINOL (see AROMATIC CHEMICALS)

ROACH POWDER (see HOUSEHOLD INSECTICIDE POWDER)

ROSE OIL (see ESSENTIAL OILS)

ROSEMARY OIL (see ESSENTIAL OILS)

ROSIN

Antwerp Naval Stores Co., Savannah, Ga.
E. W. Colledge, General Sales Agent, P. O. Box 389, Jacksonville, Fla.
Continental Turp. & Rosin Corp., Laurel, Miss.
Crosby Naval Stores, Picayune, Miss.
Dixie Pine Prods. Co., Hattiesburg, Miss. (wood)
Georgia Rosin Prods. Co., Brunswick, Ga.
Glidden Co., Naval Stores Div., P. O. Box 380, Jacksonville, Fla.
Hercules Powder Co., Wilmington, Del. (wood)
Industrial Chem. Sales Div., West Va., Pulp & Paper Co., 230 Park Ave., N. Y.
Newport Industries, Inc., 230 Park Ave., N. Y.
Phoenix Naval Stores Co., Gulfport, Miss. (wood)
Taylor, Lowenstein & Co., Mobile, Ala.

ROSIN SOAP

Armour & Co., 1355 W. 31st., Chicago
Chemical Mfg. & Dist. Co., Easton, Pa.
Crystal Soap & Chem Co., 6300 State Rd., Philadelphia
Davies-Young Soap Co., Dayton, Ohio

ROSIN SOAP (Contd.)

James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Theo. B. Robertson Prods. Co.,
700 W. Division St., Chicago, Ill.
Chas. W. Young & Co., 1247 N. 26th St., Phila.

ROTENONE PRODUCTS (see also CUBE)

Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
Derris, Inc., 79 Wall St., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
Hammond Paint & Chem. Co., Beacon, N. Y.
J. L. Hopkins & Co., 220 Broadway, N. Y.
Jooster & Janssen, 132 Front St., N. Y.
Lenape Trading Co., 225 Broadway, N. Y.
McCormick & Co., Baltimore, Md.
Orbis Products Corp., 215 Pearl St., N. Y.
S. B. Penick & Co., 132 Nassau St., N. Y.
John Powell & Co., 114 E. 32nd St., N. Y.
R. J. Prentiss & Co., 100 Gold St., N. Y.
Frank B. Ross Co., 79 Wall St., N. Y.

ROTTEN STONE (see ABRASIVES and FILLERS)

RUBBER STOPPERS (see LABORATORY APPARATUS)

RUG and UPHOLSTERY CLEANERS

Ampion Corp., 4-88—47th Ave., L. I. City, N. Y.
An-Fo Mfg. Co., 3129 Elmwood Ave., Oakland, Calif.
Candy & Co., 2515 W. 35th St., Chicago
Chemical Mfg. & Distrib. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., New York
Cole Chemical Co., 22-14—37th Ave., L. I. City, N. Y.
Crystal Soap & Chem. Co., 6300 State Rd., Phila.
Davies-Young Soap Co., Dayton, O.
Delta Chemical Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., Kensington, Philadelphia, Pa.
Haag Laboratories, 6101 S. May St., Chicago
Hild Floor Machine Co., 1313 W. Randolph St., Chicago
Hubman Supply Co., 225 N. 4th St., Columbus, O.
National Oil Prods. Co., Harrison, N. J.
Palmer Prods., Inc., Waukesha, Wis.
Theo. B. Robertson Prods. Co.,
700 W. Division St., Chicago, Ill.
J. A. Tumbler Labs., 423 Hanover St., Baltimore
Uncle Sam Chem. Co., 329 E. 29th St., New York
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
Chas. W. Young & Co., 1247 N. 26th St., Phila.

SADDLE SOAP

Armour & Co., 1355 W. 31st St., Chicago
Asco Chemical Co., 641 Lexington Ave., Brooklyn
Baum's Castorine Co., Rome, N. Y.
Crystal Soap & Chem. Co., 6300 State Rd., Philadelphia
James Good, Inc., 2116 E. Susquehanna Ave., Philadelphia
R. M. Hollingshead Corp., Camden, N. J.
Theo. B. Robertson Prods. Co.,
700 W. Division St., Chicago
Rome Soap Mfg. Co., Rome, N. Y.
John T. Stanley Co., 642 W. 30th St., N. Y.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
J. A. Tumbler Labs., 423 Hanover St., Baltimore

SAL AMMONIAC (see AMMONIUM CHLORIDE)

SAL SODA
(see also Dealers)

American Cyanamid & Chemicals Corp.,
30 Rockefeller Plaza, N. Y.
Church & Dwight Co., 70 Pine St., N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
E. I. du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Mechling Bros. Chemical Co., Camden, N. J.
Michigan Alkali Co., 10 E. 40th St., N. Y.
Pittsburgh Plate Glass Co., Columbia Chem. Div., 30 Rockefeller Plaza, N. Y.
E. M. Sergeant Pulp & Chemical Co.,
Empire State Bldg., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Joseph Turner & Co., Ridgefield, N. J.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

SALT (Common Salt)
(see also Dealers)

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Dow Chemical Co., Midland, Mich.
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International Salt Co., 475 Fifth Ave., N. Y.
Jefferson Salt & Mining Co., Louisville, Ky.
LeRoy Salt Co., LeRoy, N. Y.
Myles Salt Co., 1007 Camp St., New Orleans, La.
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
Pomeroy Salt Co., Pomeroy, Ohio
Remington Salt Co., Ithaca, N. Y.
Saginaw Salt Prods. Co., Saginaw, Mich.
Solvay Sales Corp., 40 Rector St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.

SALT WATER SOAP (Hard Water Soap)

Armour Soap Wks., 1355 W. 31st St., Chicago
Buck-Jack Co., 3056 Federal St., Baltimore
J. Eavenson & Sons, Camden, N. J.
Hewitt Soap Co., Dayton, O.
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Los Angeles Soap Co., Los Angeles
Newell-Gutradt Co., San Francisco
Procter & Gamble Co., Cincinnati, O.
John T. Stanley Co., 642 W. 30th St., N. Y.
M. Werk Co., Cincinnati

SAMPLE CASES

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Knickerbocker Case Co., 2311 N. Crawford Ave., Chicago

SAND (see ABRASIVES)

SANDALWOOD OIL (see ESSENTIAL OILS)

SAPONIN (Ext. Soap Bark)

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A. C. Drury & Co., 219 East North Water St., Chicago
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Merck & Co., Rahway, N. J.
S. B. Penick & Co., 132 Nassau St., N. Y.
Ungerer & Co., 13 W. 20th St., N. Y.

SASSAFRAS, Artificial (see AROMATIC CHEMICALS)

SCIENTIFIC INSTRUMENTS (see INSTRUMENTS)

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Armour & Co., 1355 W. 31st St., Chicago
Baum's Castorine Co., 200 Mathew St., Rome, N. Y.
Buck-Jack Co., 3056 Federal St., Baltimore
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Anhydrous soap	47.44
Free Alkali	0.00
Ash	0.45
Glycerine and undetermined matter	8.90
Sodium Salts	negligible trace
Potassium Salts	present
Physical constants of oil from soap.	
Saponification value	258
Iodine value	7.3
Solidifying point	16°C

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Fuld Bros., 702 S. Wolfe St., Baltimore
Hercules Chem. Co., 332 Canal St., N. Y.
Hubman Supply Co., 225 N. 4th St., Columbus, O.
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Allen B. Wrisley Co., 6801 W. 65th St., Chicago
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Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Cudahy Packing Co., 221 N. La Salle St., Chicago
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Hewitt Soap Co., Dayton, O.
Los Angeles Soap Co., Los Angeles
National Soap Co., P. O. Box 1631, Tacoma, Wash.
Peck's Products Co., St. Louis
Port Huron Detergent Co., Port Huron, Mich.
Procter & Gamble, Cincinnati, O.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
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General Drug Co., 644 Pacific St., Bklyn.
Haag Laboratories, Inc., 6101 S. May St., Chicago
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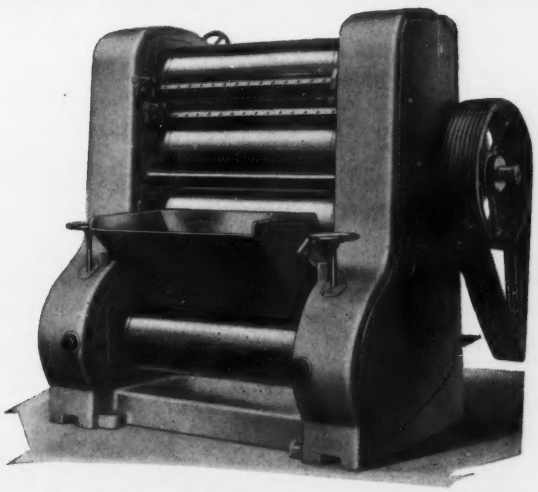
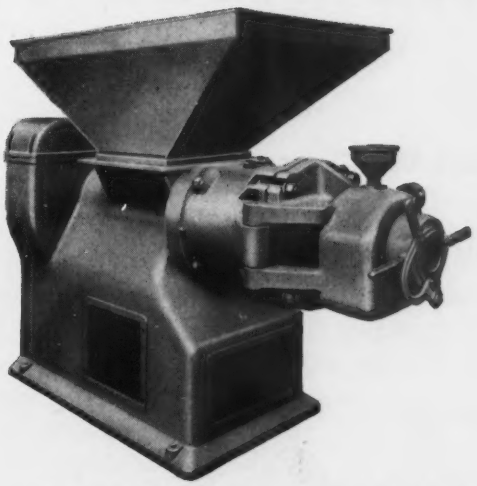
Moore Bros. Co., 67 Vestry St., N. Y.

MILLS and PLODDERS are our SPECIALTIES



SOAP MILL
TYPE 912SA



PLODDER
TYPE 364

● **LEHMANN 5-ROLL SOAP MILLS** for toilet soap milling and highest quality soap flakes have exceptional production capacity.

● **LEHMANN PLODDERS** give maximum soap density and large capacity. Improved high compression worms are durable light weight non-contaminating aluminum alloy. Built-in gear head motor gives space economy.

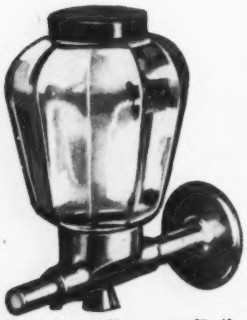
LEHMANN

The Standard for Quality in Machinery Since 1834

Send for detailed specifications

● Demonstration by arrangement at our factory at Lyndhurst, New Jersey.

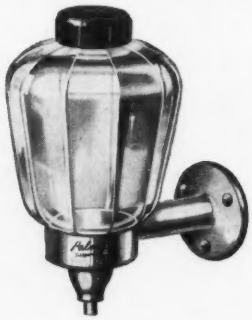
J. M. LEHMANN COMPANY, INC.
250 WEST BROADWAY NEW YORK, N. Y.



The above dispenser is the PRESPOWDER. Standard type for the dispensing of most toilet powder preparations. Pleasing design, well constructed, representing lasting value.

TILTING TYPE LIQUID--Black, milk or crystal glass. All metal parts chrome plated. A beautiful soap dispenser.

TIPOWDER DISPENSER -- Entirely practical. Black, milk or crystal glass. All metal parts chrome plated.

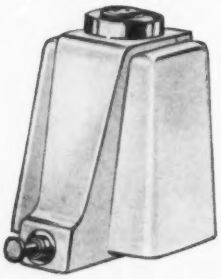


THE D-C STYLE, gravity or spring controlled valve. All metal parts chrome plated. See Neoprene construction described at left.

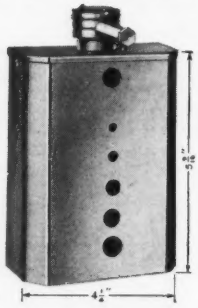
Note valve construction below for either gravity or spring controlled D.C. push-up dispenser. Patented Neoprene gasket construction that will never leak. Neoprene resists alkalies or oils. Creates a positive close fitting, non-leaking, inexpensive valve. This new patented construction is the only important improvement ever placed on a low priced dispenser and sells at as low a price as any dispenser constructed.

PRESLIQUID AND PRESTAFOAM

A solid casting dispenser, not sheet enameled cooking utensil construction but bath-tub construction. For suds or liquid. Positive screw locking large opening top, no detachable parts or weak hinges. Concealed screws — can't be rocked loose from the wall or tampered with. Replaceable valve unit. Quart capacity.



DURABILT for Liquid or Suds. All exposed body parts stainless steel. Window to see contents, but non-breakable. Large, open, glass jar inside of stainless steel housing that can be cleaned like a dish. So simple in construction that it will last forever. Beautiful in appearance, permanent in construction.



More than one-third of a century designing and manufacturing soap dispensing equipment and other sanitary appliances should and does qualify us to produce the best in design and material, and manufacturing all of our own materials in our modern plant, we are always competitive in price.

ALL KINDS, STYLES AND PRICES

Produced by ourselves in our own modern plant

WALL TYPES	METAL BOWLS	LIQUID
SLAB TYPES	GLASS BOWLS	LATHER
TILTING TYPES	PUMPER TYPES	POWDER

GRAVITY VALVES AND TANKS FOR LATHER OR LIQUID

WRITE FOR COMPLETE LITERATURE

WE ALSO MANUFACTURE a complete line of sanitary appliances and equipment, including many designs in economical serving fixtures for toilet paper and paper towels, serving paper from standard rolls at a saving greater than it can be served otherwise. A complete line of dust pans, drip machines and deodorizing block containers. Steel woolers to steel wool floors for floor applications, applicators for applying all types of floor treatments. Yarn sweepers, yarn dusters, blackboard erasers and vacuum blackboard eraser cleaners. A practical water pick-up pan to use when mopping.

PALMER PRODUCTS, INC.

Waukesha, Wisconsin, U. S. A. Adjacent to Milwaukee

SOAP DISPENSING SYSTEMS (Contd.)

Palmer Products, Inc., Waukesha, Wis.
Rochester Germicide Co., Rochester, N. Y.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
West Disinfecting Co., Long Island City, N. Y.

SOAP MACHINERY

Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Products Co., 15 Park Row, N. Y. (Used)
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259—46th St., Brooklyn
Alan Porter Lee, 136 Liberty St., N. Y.
J. M. Lehman Co., 248 West Broadway, N. Y.
Modern Packaging Machy. Co., Danville, Ill.
Newman Tallow & Soap Machy. Co., 1051 W. 35th St., Chicago
Wurster & Sanger, Inc., 5201 Kenwood Ave., Chicago

SOAP MIXING DEVICE (Solutionizing drums for soft soaps)

Clifton Chemical Co., 247 Front St., N. Y.
Davies-Young Soap Co., Dayton, O.
Rudolph Guth, Inc., 9604 Meech Ave., Cleveland, Ohio
Solutionizer Co., 7721 S. State St., Chicago
Sowers Mfg. Co., 1296 Niagara St., Buffalo

SOAP PAPER (Soap Sheets)

Moore Bros. Co., 67 Vestry St., N. Y.
Rosefelt Sales Builders, 740 N. Plankinton Ave., Milwaukee, Wisc.
Velso Products Co., Ottumwa, Iowa

SOAP PERFUMES

Allondon-Bayonne Co., 11 Park Pl., N. Y.
van Ameringen-Haebler, Inc., 315 4th Ave., N. Y.
Aromatic Products, Inc., 15 E. 30th St., N. Y.
Ph. Chaleyer, Inc., 160 E. 56th St, N. Y.
Antoine Chiris Co., 115 E. 23rd St., N. Y.
Compagnie Parento, Croton-on-Hudson, N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.
P. R. Dreyer Inc., 119 W. 19th St., N. Y.
E. I. du Pont de Nemours & Co., Wilmington, Del.
Felton Chemical Co., 603 Johnston Ave., Brooklyn
Firmenich & Co., 135 5th Ave., N. Y.
Florasynth Labs., 1513 Olmstead Ave., Bronx, N. Y.
Benj. French, Inc., 160—5th Ave., N. Y.
Fritzsche Bros., Inc., 76 Ninth Ave., N. Y.
Fuld Bros., 702-710 S. Wolfe St., Baltimore
General Drug Co., 64 Pacific St., Brooklyn, N. Y.
Givaudan-Delawanna, Inc., 330 W. 42nd St., N. Y.
Kay-Fries Chemicals, Inc., 180 Madison Ave., N. Y.
Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., N. Y.
Naugatuck Aromatics, 12 E. 12th St., N. Y.
Neumann-Buslee & Wolfe, 224 W. Huron St., Chicago
Norda Essential Oil & Chem. Co., 601 W. 16th St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
Polak & Schwarz, Inc., 667 Washington St., N. Y.
Polak's Frutal Works, 36-14 35th St., L. I. City, N. Y.
Rifa-New York, Inc., 153 Waverly Pl., N. Y.
Roure-Dupont, Inc., 351 4th Ave., N. Y.
Schimmel & Co., 601 W. 26th St., N. Y.
Edwin Seebach Co., 912 Broadway, N. Y.
Standard Synthetics Co., 119 W. 25th St., N. Y.
Tombarel Prods. Corp., 9 E. 19th St., N. Y.
Ungerer & Co., 13 W. 20th St., N. Y.
Albert Verley, Inc., 1621 Carroll Ave., Chicago

SOAP POWDER MILLS

Abbe Engineering Co., 50 Church St., N. Y.
Consolidated Products Co., 15 Park Row, N. Y. (Used)

Your subscription to

SOAP & SANITARY CHEMICALS

THIS 1941 **BLUE BOOK** COMES TO YOU WITHOUT EXTRA COST AS PART OF YOUR REGULAR PAID SUBSCRIPTION TO *SOAP & SANITARY CHEMICALS*. IT IS DESIGNED AS A *COMPACT, USABLE* BUYERS' GUIDE AND REFERENCE MANUAL. IF THE INFORMATION YOU DESIRE IS NOT INCLUDED, WRITE TO US AND WE WILL GLADLY DO OUR BEST TO LOCATE IT FOR YOU.

THE PUBLISHERS.

No. 101 UNIT—consists of

1—8″ Plodder

1—3 Roll Mill

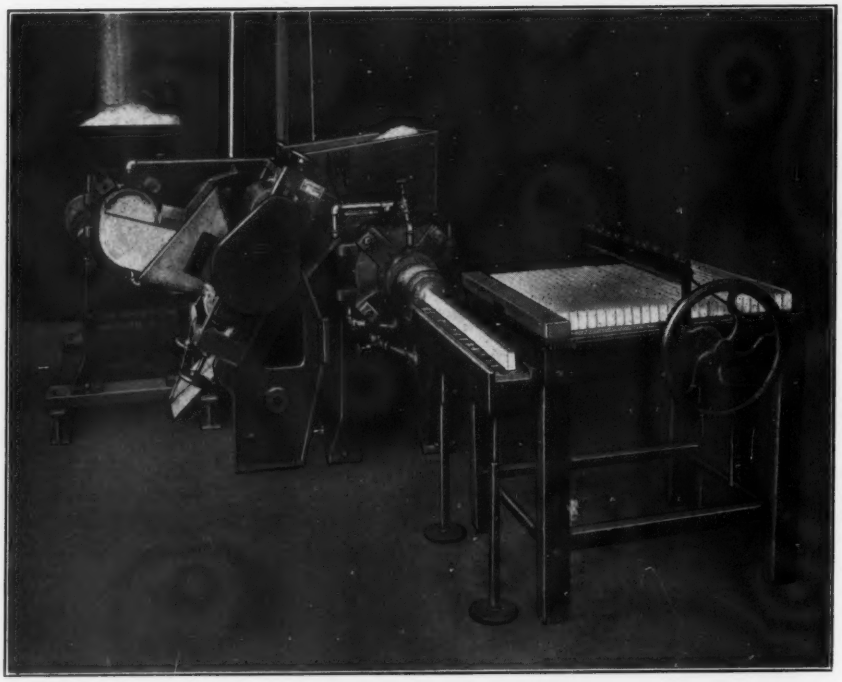
1—10″ Double Head Plodder

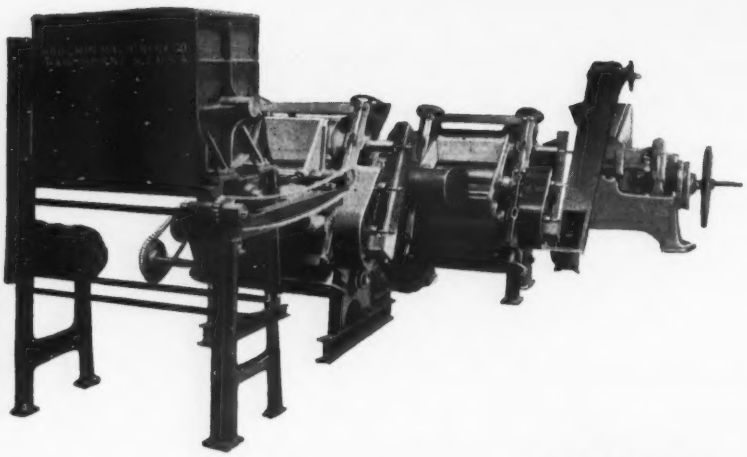
Roller Board

Cutting Table

1—20 H.P. Motor

The above installation is made in several sizes, having a capacity of 400 to 600 lbs. per hour, passing the soap through twice. Larger units with only one passing of the soap to the finished bar made for capacity of 800 to 1,000 lbs. per hour.





Complete Unit No. 3

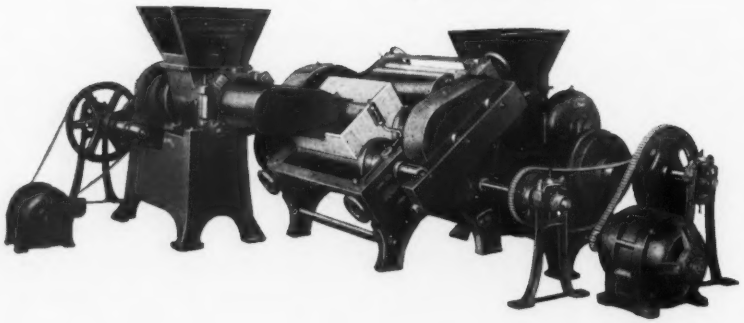
Capacity 1,000 lbs. per hour (once through)

Unit consists of:
(1) Ideal Amalgamator.
(1) Three-Roll Mill, Rolls 12″x30″.
(1) 8″ Preliminary Plodder with Screen.
(1) Three-Roll Mill, Rolls 12″x30″.
(1) 8″ Preliminary Plodder with Screen.
(1) Conveying Screw with motor.
(1) 10″ Finishing Plodder with Electric Heater and Forming Plate.
(1) Automatic Cutter.
Unit operated by (2) 15 H. P.—(1) 10 H. P.—(1) 5 H. P.—(1) ½ H. P. Motors. Roller Chain Drives.
Complete Weight 24,000 lbs. Floor Space 15 ft. x 21 ft.
These units are only recommended for long runs of Soap.

Unit No. 2

Capacity 500 lbs. per hour (twice through)

Unit consists of:
(1) 8″ Preliminary Plodder.
(1) Three-Roll Chilled Iron Water Cooled Mill. Rolls 12″x30″.
(1) 10″ Double Head Plodder.
(1) 10 H. P. Motor.
(1) 7½ H. P. Motor.
Recommended for short runs of Soap, where Perfume and Color are frequently changed. An Amalgamator is recommended to mix Perfume and Color before passing the Soap to this unit.



HOUCHIN MACHINERY CO., Inc.

HAWTHORNE, N. J., U. S. A.

SOAP POWDER MILLS (Contd.)

Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 359 46th St., Brooklyn, N. Y.
J. M. Lehmann Co., 250 W. Broadway, N. Y.
Prater Pulverizing Co., 1825 S. 55th Ave., Chicago

SOAP POWDERS
(Do not confuse with powdered white soap)

American Soap Powder Wks., Inc., 98 Van Dyk St., Brooklyn
American Soap & Washoline Co., Cohoes, N. Y.
Armour Soap Wks., 1355 W. 31st St., Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Beach Soap Co., Lawrence, Mass.
Cowles Detergent Co., 7016 Euclid Ave., Cleveland
Chemical Mfg. & Dist. Co., Easton, Pa.
Cudahy Packing Co., 221 N. La Salle St., Chicago
Du Bois Soap Co., Cincinnati
J. Eavenson & Sons, Camden, N. J.
Hewitt Soap Co., Dayton, O.
Hochwald Chemical Co., 135 Mississippi St., San Francisco
H. Kohnstamm & Co., 91 Park Pl., N. Y.
Geo. E. Marsh Co., 200 Broadway, Cambridge, Mass.
Napthole, Inc., 15 E. 26th St., N. Y.
National Milling & Chem. Co., Manayunk, Phila.
North Coast Soap & Chem. Wks., Seattle, Wash.
Port Huron Detergent Co., Port Huron, Mich.
Procter & Gamble Co., Cincinnati
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Sanitary Floor Compound Co., 104 Railroad Ave., Paterson, N. J.
S. & S. Soap Co., 324 Barretto St., Bronx, N. Y.
Stevens Soap Corp., 200 Sullivan St., Brooklyn
John T. Stanley Co., 642 W. 30th St., N. Y.
Swift & Co., Union Stock Yards, Chicago
Vasco Prods. Co., Elmira, N. Y.
Vliet Soap Co., 638 Monroe St., Brooklyn
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
M. Werk Co., St. Bernard, Cincinnati
Chas. W. Young & Co., Phila.

SOAP PRESSES (see PRESSES)

SOAP SHEETS (See SOAP PAPER)

SOAP SLABBERS (see SOAP MACHINERY)

SOAP STOCK (Boiled down cotton oil soap stock, etc.)
(see also Brokers and Dealers)

Armour & Co., 1355 W. 31st St., Chicago
T. G. Cooper & Co., 47 N. 2nd St., Phila.
Durkee Famous Foods, Inc., 2670 Elston Ave., Chicago
Portsmouth Cotton Oil Refining Co., Portsmouth, Va.
Procter & Gamble Co., Cincinnati, O.
Southern Cotton Oil Co., Produce Exchange, N. Y.
A. E. Staley Mfg. Co., Decatur, Ill.

SOAP VALVES (See Soap Dispensing Systems)

SOAP WRAPPING MACHY. (See WRAPPING MACHY.)

SOAPLESS DETERGENTS (see DETERGENTS, SYNTHETIC)

SOAPLESS SHAMPOOS (see SHAMPOOS, SOAPLESS)

SOAPS, AUTO (see POTASH SOAPS)

SOAPS, FLOATING (see FLOATING SOAPS)

SOAPS, LIQUID (see POTASH SOAPS)

SOAPS, MEDICINAL, CAKE (see MEDICINAL SOAPS, CAKE)

SOAPS, MOTTLED (see MOTTLED SOAPS)

SOAPS, PINE SCRUB (See PINE SCRUB SOAPS)

SOAPS, SCOURING (see SCOURING SOAPS)

SOAPS, SCRUBBING (see FLOOR SCRUB SOAPS)

SOAPS, SURGICAL (see POTASH SOAPS)

SOAPS, TEXTILE (see TEXTILE SOAPS)

SODA ASH
(see also Dealers)

American Cyanamid & Chemicals Corp., 30 Rockefeller Plaza, N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
Dow Chemical Co., Midland, Mich.
E. I. du Pont de Nemours Co., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Mathieson Alkali Wks., 60 E. 42nd St., N. Y.
Michigan Alkali Co., 60 E. 42nd St., N. Y.
Niagara Alkali Co., 60 E. 42nd St., N. Y.
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

SODA (Modified)
(see also Dealers)

American Cyanamid & Chemicals Corp., 30 Rockefeller Plaza, N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
Innis, Speiden & Co., 117 Liberty St., N. Y.
Mathieson Alkali Wks., 60 E. 42nd St., N. Y.
Michigan Alkali Co., 60 E. 42nd St., N. Y.
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

SODIUM ALGINATE

Kelco Co., 31 Nassau St., N. Y.

SODIUM BICARBONATE
(see also Dealers)

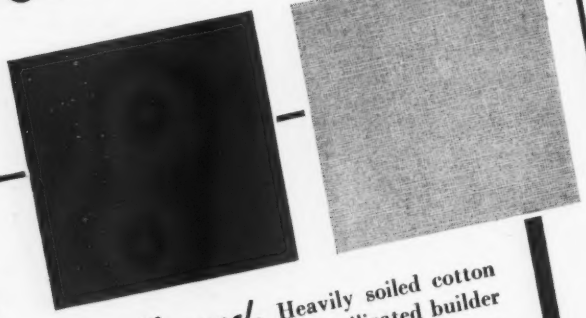
American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y.
Church & Dwight Co., 70 Pine St., N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
E. I. du Pont de Nemours & Co., Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Mathieson Alkali Works, 60 E. 42nd St., N. Y.
Michigan Alkali Co., 60 E. 42nd St., N. Y.
Monsanto Chem. Co., St. Louis
Pennsylvania Salt Mfg. Co., Widener Bldg., Philadelphia
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

SODIUM BICHROMATE
(see also Dealers)

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh

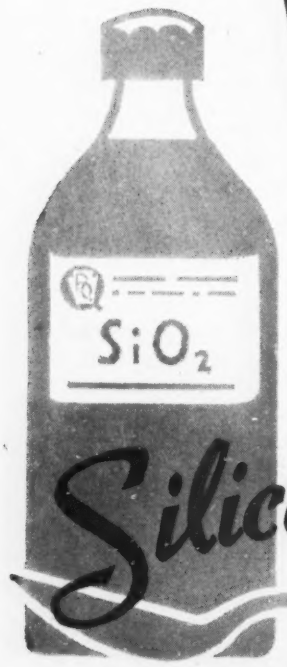
PQ SOLUBLE SILICATES
A "TONIC" TO SALES

1 ***Greater Dirt Suspension*** Solid dirt is held in suspension by soluble silica. This is shown above. *Right*: Water and manganese dioxide. *Left*: Water, .025% silicate and manganese dioxide. After 12 days.



2 ***Better Dirt Removal.*** Heavily soiled cotton fabric before and after washing with silicated builder and soap. No bleach used. The SiO_2 in silicates protects against redeposition of dirt.

3 ***More Sudsing Power*** Same quantity water and soap in each jar. Two teaspoonfuls caustic to left hand jar, two of silicate to right hand jar. Shaking produced suds shown. In right jar, suds rose to cap and remained stable. The silica in PQ Silicates improves sudsing action in your detergents.



PQ Soluble Silicates of Soda add greater efficiency to your soaps and cleansers. And one outstanding reason is this little symbol SiO_2, which you know chemically stands for silica content.

The correctly proportioned amount of silica in sodium silicate builds these three illustrated qualities into your soap and cleansers.

All are yours at low cost. You get more detergent values from PQ Silicates per pound than from other known salts, and so do your customers. They measure the improved cleaning in whiter whites, brighter colors, sparkling dishes, etc.

Let's talk over the role of silica and its relation to your formulas, whatever the ingredients may be.

Silicate of Soda

PHILADELPHIA QUARTZ COMPANY

Established 1831 General Offices and Laboratory: 125 S. Third Street, Philadelphia, Pa.
Chicago Sales Office: Engineering Bldg. Sold in Canada by National Silicates Ltd., Toronto, Ont.

SODIUM BICHROMATE (Contd.)

E. I. du Pont de Nemours Co., Wilmington, Del.
General Chem. Co., 40 Rector St., N. Y.
Merck & Co., Rahway, N. J.
Mutual Chemical Co., 270 Madison Ave., N. Y.
Natural Products Refining Co., 900 Garfield Ave., Jersey City, N. J.
Prior Chem. Corp., 420 Lexington Ave., N. Y.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
Jos. Turner & Co., Ridgefield, N. J.

SODIUM CARBONATE (see SODA ASH)

SODIUM CHOLATE (Bile Salt)

Digestive Ferments Co., Detroit
R. W. Greeff & Co., 10 E. 40th St., N. Y.
Wilson Labs., 4221 S. Western Ave., Chicago

SODIUM CYANIDE

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
E. I. du Pont de Nemours Co., Wilmington, Del.
General Chem. Co., 40 Rector St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.

SODIUM FLUORIDE (see FLUORIDES)

SODIUM HYDROSULFITE

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
J. T. Baker Chem. Co., Phillipsburg, N. J.
E. I. du Pont de Nemours & Co., Wilmington, Del.
General Chem. Co., 40 Rector St., N. Y.
General Dyestuffs Corp., 435 Hudson St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Rohm & Haas Co., Inc., 222 W. Washington Sq., Phila.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Royce Chemical Co., Carlton Hill, N. J.

SODIUM HYPOCHLORITE (see CHLORINE, see LAUNDRY BLEACH)

SODIUM HYPOSULFITE (Thiosulfate)

E. I. du Pont de Nemours & Co., Wilmington, Del.
General Chem. Co., 40 Rector St., N. Y.
A. R. Maas Chem. Co., South Gate, Calif.
Mallinckrodt Chem. Wks., St. Louis
Merck & Co., Rahway, N. J.
Rohm & Haas, 222 W. Washington Sq., Phila.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.

SODIUM LAUYRL SULFATE (see SULFONATED FATTY ALCOHOLS

SODIUM METAPHOSPHATE

Blockson Chemical Co., Joliet, Ill.
Calgon, Inc., 300 Ross St., Pittsburgh
Victor Chem. Wks., 141 W. Jackson Blvd., Chicago

SODIUM METASILICATE

Cowles Detergent Co., 7016 Euclid Ave., Cleveland
Diamond Alkali Co., Standard Silicate Div., 535 Smithfield St., Pittsburgh
E. I. du Pont de Nemours & Co., Wilmington, Del.
General Chem. Co., 40 Rector St., N. Y.
Mechling Bros., Chemical Co., Camden, N. J.
Philadelphia Quartz Co., 125 So. 3rd St., Phila.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

SODIUM NAPHTHENATE

E. I. du Pont de Nemours & Co., Wilmington, Del.
General Dyestuffs Corp., 435 Hudson St., N. Y.
National Aniline & Chem. Co., 40 Rector St., N. Y.

SODIUM ORTHOSILICATE

Diamond Alkali Co., Standard Silicate Div., 535 Smithfield St., Pittsburgh
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Phila.
Philadelphia Quartz Co., 125 S. 3rd St., Phila.

SODIUM PERBORATE
(see also Dealers)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
E. I. du Pont de Nemours, Wilmington, Del.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Merck & Co., Rahway, N. J.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.

SODIUM PYROPHOSPHATE (See TETRA SODIUM PYROPHOSPHATE

SODIUM SESQUICARBONATE

Diamond Alkali Co., 535 Smithfield St., Pittsburgh
Mathieson Alkali Wks., 60 E. 42nd St., N. Y.
Mechling Bros., Chemical Co., Line St. & Coopers Creek, Camden, N. J.
Pittsburgh Plate Glass Co., Columbia Chemical Div., 30 Rockefeller Plaza, N. Y.
Solvay Sales Corp., 40 Rector St., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

SODIUM SESQUISILICATE

Diamond Alkali Co., Standard Silicate Div., 535 Smithfield St., Pittsburgh
Philadelphia Quartz Co., 125 S. 3rd St., Phila.

SODIUM SILICATE
(see also Dealers)

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y.
Diamond Alkali Co., Standard Silicate Div., 535 Smithfield St., Pittsburgh
E. I. du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Mechling Bros. Chem. Co., Camden, N. J.
Philadelphia Quartz Co., 125 S. 3rd St., Phila.

SODIUM SILICOFLUORIDE

American British Chem. Supplies, Inc., 180 Madison Ave., N. Y.
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
American Fluoride Corp., 151 W. 19th St., N. Y.
Blockson Chemical Co., Joliet, Ill.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Charles Hardy, Inc., 415 Lexington Ave., N. Y.
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Merck & Co., Rahway, N. J.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
Jos. Turner & Co., Ridgefield, N. J.

INSURE REPEAT ORDERS

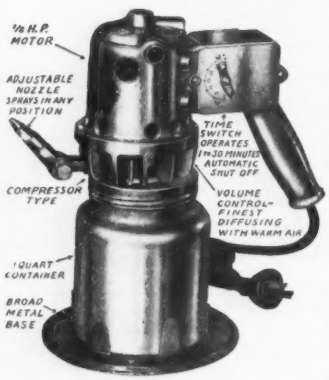
FOR YOUR INSECTICIDE BY FURNISHING

BREUER

PORTABLE ELECTRIC SPRAYERS

The Right Size and Type for Every Customer

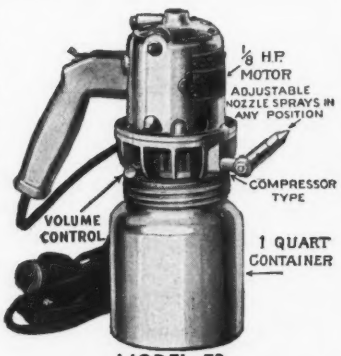
BETTER PERFORMANCE THAN EVER! Models 53 and 54


1/8 H.P. MOTOR
ADJUSTABLE NOZZLE SPRAYS IN ANY POSITION
TIME SWITCH OPERATES 1 to 30 MINUTES AUTOMATIC SHUT OFF
COMPRESSOR TYPE
VOLUME CONTROL-FINEST DIFFUSING WITH WARM AIR
1 QUART CONTAINER
BROAD METAL BASE

MODEL 54

These two popular, quart-size, compressor-type sprayers have been still further improved by the use of huskier GE Motors, which give them definitely improved performance. Both models have high-grade aluminum castings throughout, one quart aluminum containers, convenient air volume control to regulate the density of spray, adjustable nozzles for spraying upward or downward at any angle, and 20′ of rubber covered cord.

MODEL 54. Automatic type. Has thirty minute time switch. Simply turn pointer to number of minutes operation desired, and the machine will diffuse desired quantity of liquid shutting off automatically at end of desired period. Equipped with broad metal base.



MODEL 53

MODEL 53. Similar in construction to Model 54, but with toggle-switch, for manual operation. A compressor-type electric hand sprayer of finest quality at low price.

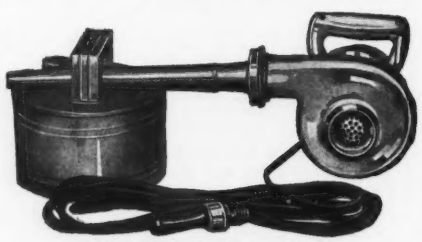
MODELS 50 and 51

1/3 H.P. G.E. MOTOR
TIME SWITCH OPERATES 1 TO 45 MINUTES AUTOMATIC SHUT OFF
ADJUSTABLE NOZZLE SPRAYS IN ANY POSITION
VOLUME CONTROL FINEST DIFFUSING WITH WARM AIR
COMPRESSOR TYPE
1 GALLON CONTAINER

MODEL 36

MODEL 36. A powerful large capacity sprayer for covering larger areas rapidly with finest diffusion and penetration. One gallon container. 1/3 H.P. GE Motor. Adjustable nozzle; thirty-minute automatic time switch. Air volume control regulates density of spray. The last word in quality and performance.

MODEL 50. Free air type unit. 1/8 H.P. GE Motor, one pint glass container. Recommended for spraying on crawling insects. Sprays oil or water base liquids. Model 51 is similar in construction, but with one quart container.



MODELS 6A, 8A and 10A

3 BIG SPRAYERS FOR LARGE AREAS

Model 6A, Model 8A and Model 10A are powerful blower type sprayers which will project the spray instantly for distances of from 20 to 40 feet, giving fast, thorough coverage of large areas. The spray easily reaches remote corners and high ceilings. One gallon metal container. Ball bearing GE Motors—no oiling. Recommended for warehouses, theatres, dairy barns and other large buildings.

Write today for prices and full details.

BREUER ELECTRIC MFG. CO.

5120 N. Ravenswood Avenue — ***We do not sell insecticides. Our business is manufacturing sprayers. Patented in U. S. A. and Foreign Countries.*** — **Chicago, Illinois**

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American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y.
Apex Chemical Co., 225 W. 34th St., N. Y.
Arabol Mfg. Co., 110 E. 42nd St., N. Y.
Atlantic Refining Co., 260 S. Broad St., Phila.
Napthole, Inc., 15 E. 26th St., N. Y.
Richards Chemical Works, Warren and Morris Sts., Jersey City, N. J.
L. Sonneborn Sons, Inc., 88 Lexington Ave., N. Y.
Jacques Wolf & Co., Passaic, N. J.

SOLUTIONIZERS (solutionizing drums for soft soaps) (see SOAP MIXING DEVICE)

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Barrett Co., 40 Rector St., N. Y.
S. H. Bell Co., 1407 Gulf Bldg., Pittsburgh
Commerce Petroleum Co., 3042 Archer Ave., Chicago
Deep Rock Oil Corp., 155 N. Clark St., Chicago
Wm. E. Jordan & Bro., 2590 Atlantic Ave., Brooklyn
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
Neville Co., Pittsburgh
Pittsburgh Coal Carbonization Co., Oliver Bldg., Pittsburgh
Reilly Tar & Chemical Corp., Indianapolis
Shell Petroleum Corp., Shell Bldg., St. Louis
Standard Oil Co. (Calif.), 225 Bush St., San Francisco
Standard Oil Co., (Ind.) 910 S. Michigan Ave., Chicago

SOLVENTS, ORGANIC

Barrett Co., 40 Rector St., N. Y.
Carbide & Carbon Chem. Corp., 30 E. 42nd St., N. Y.
Diamond Alkali Co., 535 Smithfield St., Pittsburgh
Delta Chemical Co., 2101 Washington Blvd., Baltimore (Monochlorbenzene & Tri-chlorbenzene)
Dow Chemical Co., Midland, Mich.
E. I. du Pont de Nemours & Co., Wilmington, Del.
Hercules Powder Co., Wilmington
Hooker Electrochemical Co., Niagara Falls, N. Y.
Kessler Chem. Corp., 239—11th Ave., N. Y.
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
Neville Co., Pittsburgh
Pittsburgh Coal Carbonization Co., Oliver Bldg., Pittsburgh
Reilly Tar & Chemical Corp., Indianapolis
Sharples Solvents Corp., Phila.
Standard Alcohol Co., 26 Broadway, N. Y.
U. S. Industrial Chem. Co., 60 E. 42nd St., N. Y.
Warner Chemical Co., 405 Lexington Ave., N. Y.

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American Mineral Spirits Co., 330 S. Michigan Ave., Chicago
Anderson-Pritchard Oil Co., Oklahoma City, Okla.
Atlantic Refining Co., 260 S. Broad St., Philadelphia
Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.
Commerce Petroleum Co., 3042 Archer Ave., Chicago
Deep Rock Oil Corp., 155 N. Clark St., Chicago
E. I. du Pont de Nemours Co., Wilmington, Del.
Pennsylvania Refining Co., Butler, Pa.
Sinclair Refining Co., 630—5th Ave., N. Y.
Skelly Oil Corp., 605 W. 47th St., Kansas City, Mo.
L. Sonneborn Sons, 88 Lexington Ave., N. Y.
Standard Oil Co. (Calif.), 225 Bush St., San Francisco
Standard Oil Co., (Ind.) 910 S. Michigan Ave., Chicago
Standard Oil Co., (Ohio) Midland Bldg., Cleveland

SOYA BEAN OIL
(see also Brokers and Dealers)

Balfour, Guthrie Co., 67 Wall St., N. Y.
Irving R. Boody & Co., 99 Wall St., N. Y.
Eastern Industries, Inc., Ridgefield, N. J.
William O. Goodrich Co., Milwaukee, Wis.
W. R. Grace & Co., 7 Hanover Sq., N. Y.
Spencer Kellogg & Son, Buffalo, N. Y.
Mitsubishi Shoji Kaisha, 120 Broadway, N. Y.
Mitsui & Co., 350—5th Ave., N. Y.
Murray Oil Products Co., 21 West St., N. Y.
Pacific Vegetable Oil Co., 62 Townsend St., San Francisco
Procter & Gamble Co., Cincinnati
Purina Mills, St. Louis
J. H. Redding Co., 17 Battery Pl., N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland
A. E. Staley Mfg. Co., Decatur, Ill.
A. E. Starkie Co., 528 N. Cuyler Ave., Oak Park, Ill.
Wecoline Products, Inc., 15 E. 26th St., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

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E. A. Bromund Co., 258 Broadway, N. Y.
A. C. Drury & Co., 219 E. North Water St., Chicago
Innis, Speiden & Co., 117 Liberty St., N. Y.
Lenape Trading Co., 225 Broadway, N. Y.
George H. Lincks, 123 Front St., N. Y.
Neumann-Buslee & Wolfe, 224 W. Huron St., Chicago, Ill.
Orbis Products Corp., 215 Pearl St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
L. A. Salomon & Bro., 216 Pearl St., N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland
Smith & Nichols, 121 Maiden Lane, N. Y.
Strohmeyer & Arpe Co., 139 Franklin St., N. Y.
Will & Baumer Candle Co., Syracuse, N. Y.

SPONGES

Allied Industrial Prods. Co., 17 N. Elizabeth St., Chicago
American Sponge & Chamois Co., 47 Ann St., N. Y.
American Standard Mfg. Co., 2509 Lime St., Chicago
Atlas Sponge Co., 291 Church St., N. Y.
Florida Sponge & Chamois Co., 42 Cliff St., N. Y.
Great Eastern Sponge & Chamois Co., 833 N. Catt. Pk. Ave., Baltimore
James H. Rhodes & Co., 157 W. Hubbard St., Chicago
Robinson Sponge Co., 1805 Atlantic Ave., Brooklyn

SPOTTING FLUIDS (see CLEANING FLUIDS)

SPRAY POWDERS (see SOAP POWDERS)

SPRAYERS, BOTTLE

Arnold-Copeland Co., 368 Congress St., Boston
Federal Tool Corp., 412 Leavitt St., Chicago
Wilco Co., 7016 McKinley Ave., Los Angeles

SPRAYERS, COMPRESSED AIR

Acmeline Mfg. Co., Traverse City, Mich.
Binks Mfg. Co., 3114 Carroll Ave., Chicago
Breuer Electric Mfg. Co., 5120 N. Ravenswood Ave., Chicago
E. C. Brown Co., Rochester, N. Y.
DeVilbiss Co., Toledo, O.
Dobbins Mfg. Co., Elkhart, Ind.
Electric Sprayit Co., 1415 Illinois Ave., Sheboygan, Wis.
Fumeral Co., Racine, Wis.
Hudson Mfg. Co., 589 E. Illinois St., Chicago
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago
Lowell Mfg. Co., North Pier Terminal, Chicago
Mystic Products Co., 417 No. 15th St., Minneapolis
D. B. Smith & Co., Utica, N. Y.
Simmons Paint Spray Brush Co., Dayton, O.
Volume Sprayer Mfg. Co., Tulsa, Okla.

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Acmeline Mfg. Co., Traverse City, Mich.
Binks Mfg. Co., 3114 Carroll Ave., Chicago
Breuer Electric Mfg. Co., 5120 N. Ravenswood Ave., Chicago
Dobbins Mfg. Co., Elkhart, Ind.
DuLa Mfg. Co., 351 Atlantic Ave., Brooklyn, N. Y.
Electric Sprayit Co., 1415 Illinois Ave., Sheboygan, Wis.
Fumeral Co., Racine, Wisc.
Hudson Mfg. Co., 589 E. Illinois St., Chicago
Lowell Mfg. Co., North Pier Terminal, Chicago

Dobbins Superbilt

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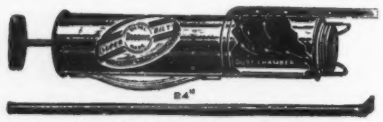
No. 170 SOAP SPRAYER
A High Pressure Portable Sprayer for the economical application of scrubbing soap or floor cleaning compounds to large floor surfaces.

No. S-122-G SOAP SPRAYER
A convenient soap sprayer for janitor service. Hose, valves and all gaskets are made from materials that will withstand the caustic action of soap and cleaners.



No. 133 NEW TYPE DUSTER
Uniform discharge. The most efficient hand duster manufactured.

Write for Catalog and Price List

WE CAN SOLVE YOUR SPRAY PROBLEMS

This Patented Spray Cap develops a wide fan shaped, flat spray that thoroughly covers a surface three feet in width. Enables the operator to prevent spray on walls, baseboards and furniture.
Furnished with the No. S-122-G Sprayer.

No. 35-G 3 QUART CAPACITY

HIGH PRESSURE CHEMICAL SPRAYER WITH CONTROLLED ATOMIZATION
The discharge has a wide range of adjustments, from a forceful, penetrating spray, to fine floating fog, with in-between variations.

No. 43G-3 QUART CAPACITY
Pressure Sprayer with lever control. Can be operated as continuous sprayer by holding lever down while pumping. Very convenient and efficient.

A complete line of Hand Sprayers and Atomizers.

No. 10 Floor Oil Sprayer with Air Regulator and Volume Control. 1½ gal. Capacity.

There is a Dobbins SUPERBILT Sprayer or Duster that will make your Good Products more effective.

DOBBINS MANUFACTURING CO.

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SALES OFFICE
ELKHART, INDIANA

FACTORIES AT
NORTH ST. PAUL, MINN.
ELKHART, INDIANA

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Edelman Co., 6249 S. St. Lawrence Ave., Chicago
Electric Sprayit Co., 1415 Illinois Ave., Sheboygan, Wis.
Fumeral Co., Racine, Wis.
Kaz Mfg. Co., 611 W. 43rd St., N. Y.
Lowell Mfg. Co., North Pier Terminal, Chicago
Mystic Products Co., 417 N. Fifth St., Minneapolis

SPRAYERS, HAND

Acmeline Mfg. Co., Traverse City, Mich.
E. C. Brown Co., Rochester, N. Y.
Continental Can Co., 100 E. 42nd St., N. Y.
Dobbins Mfg. Co., North St. Paul, Minn.
Electric Sprayit Co., 1415 Illinois Ave., Sheboygan, Wis.
Hudson Mfg. Co., 589 E. Illinois St., Chicago
Jaeckh Mfg. Co., Cincinnati
Lowell Mfg. Co., North Pier Terminal, Chicago
D. B. Smith Co., Utica, N. Y.
Standard Container, Inc., Bloomfield, N. J.
Universal Metal Prods. Co., Lowell, Mich.
Volume Sprayer Mfg. Co., Tulsa, Okla.

SPRAYERS, MOUTH

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Arnold-Copeland Co., 368 Congress St., Boston
H. D. Hudson Mfg. Co., 589 E. Illinois St., Chicago
Lowell Mfg. Co., North Pier Terminal, Chicago
D. B. Smith & Co., Utica, N. Y.
Standard Container, Inc., Bloomfield, N. J.

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A. F. Dormeyer Mfg. Co., 4316 N. Kilpatk. St., Chicago
Haisler Bros. Co., 215 W. Superior St., Chicago
Aug. Hanke & Son Co., 6326 W. Cuyler Ave., Chicago
J. Racenstein & Co., 621 Broadway, N. Y.
Reliance Hardward & Mfg. Co., 1438 N. Keating St., Chicago

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Associated Chemists, Inc., 2947 N. Oakley Ave., Chicago
J. L. Hopkins & Co., 220 Broadway, N. Y.
McLaughlin Gormley King Co., 1715—5th St., S. E., Minneapolis, Minn.
S. B. Penick & Co., 132 Nassau St., N. Y.
R. J. Prentiss & Co., 100 Gold St., N. Y.
Ratin Laboratory, 116 Broadway St., N. Y.

STANNOUS CHLORIDE **(see TIN CRYSTALS)**

STARCH
(see also Dealers)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Arabol Mfg. Co., 110 E. 42nd St., N. Y.
Chicago Starch Co., 2708 S. Throop St., Chicago
T. G. Cooper & Co., 47 N. 2nd St., Phila.
A. C. Drury & Co., 219 E. N. Water St., Chicago
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Keever Starch Co., Columbus, O.
H. Kohnstamm & Co., 91 Park Pl., N. Y.
National Adhesives Corp., 820 Greenwich St., N. Y.
National Starch Prods., 820 Greenwich St., N. Y.
Orbis Products Corp., 215 Pearl St., N. Y.
L. A. Salomon & Bro., 216 Pearl St., N. Y.
A. E. Staley Mfg. Co , Decatur, Ill.
Charles A. Wagner Co., 813 Callowhill St., Phila.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

STEARATES (Zinc, Calcium, Magnesium, etc.)
(see also Dealers)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
E. I. du Pont de Nemours Co., Wilmington, Del.
Franks Chem. Prods. Co., 55—33rd St., Brooklyn
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
Hooker Electrochemical Co., Niagara Falls, N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Mallinckrodt Chem. Wks., St. Louis
Merck & Co., Rahway, N. J.
Metasap Chemical Co., Harrison, N. J.
M. W. Parsons, Inc., 55 Ann St., N. Y.
H. H. Rosenthal Co., 25 E. 26th St., N. Y.

STEARIC ACID
(see also Brokers and Dealers)

American British Chem. Supplies, Inc., 180 Madison Ave., N. Y.
American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Armour & Co., 1355 W. 31st St., Chicago
Celina Stearic Acid Co., Celina, Ohio
Century Stearic Acid Candle Wks., 41 E. 42nd St., N. Y.
Darling & Co., 4201 S. Ashland Ave., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
Emery Industries, Inc., 4300 Carew Tower, Cincinnati
A. Gross & Co., 122 E. 42nd St., N. Y.
W. C. Hardesty Co., 41 E. 42nd St., N. Y.
Harkness & Cowing, Ivorydale, Cincinnati
Innis, Speiden & Co., 117 Liberty St., N. Y.
National Oil Prods. Co., Harrison, N. J.
Orbis Products Corp., 215 Pearl St., N. Y.
Procter & Gamble Co., Cincinnati
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Theobald Industries, Kearny, N. J.
Wecoline Products, Inc., 15 E. 26th St., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.
M. Werk Co., St. Bernard, Cincinnati
Will & Baumer Candle Co., Syracuse, N. Y.
Wilson-Martin Co., Snyder Ave. & Swanson St., Phila.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

STEARINE
(see also Brokers and Dealers)

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Darling & Co., 4201 S. Ashland Ave., Chicago
Durkee Famous Foods, Inc., 2670 Elston Ave., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
Emery Industries, Inc., 4300 Carew Tower, Cincinnati
W. C. Hardesty Co., 41 E. 42nd St., N. Y.
Independent Mfg. Co., Bridesburg P. O., Phila.
Morris Co., Union Stock Yards, Chicago
Procter & Gamble Co., Cincinnati
Werner G. Smith Co., 2191 W. 110th St., Cleveland
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Louis Stern Sons, Inc., Produce Exch., N. Y.
Swift & Co., Union Stock Yards, Chicago
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.
Wilson & Co., 4100 Ashland Ave., Chicago

STEARINE PITCH

Armour & Co., 1355 W. 31st St., Chicago
Darling & Co., 4201 S. Ashland Ave., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
Emery Industries, 4300 Carew Tower, Cincinnati
A. Gross & Co., 122 E. 42nd St., N. Y.
W. C. Hardesty Co., 41 E. 42nd St., N. Y.
Procter & Gamble Co., Ivorydale, O.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Wilson & Co., Snyder Ave., Phila.

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Nuchar Activated Carbon

Fatty Acids from pine wood

LIQRO (Crude Tall Oil) is used in the manufacture of low priced Soaps and Soap Products, Asphalt Emulsions, Cutting Oils, Flotation Reagents, Pitches, Animal Dips and many other products where a low cost, efficient base is required.

INDUSOIL (Refined Tall Oil) is inexpensive and is used in place of Red Oil and other fatty acids in the manufacture of Textile Oils and Soaps, Soluble Oils, Penetrating Oils, Drawing and Cutting Oils, Greases, Polishes, and Paint Oils.

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Snow Top is the highest quality calcium carbonate and possesses these important characteristics: high chemical and physical purity, neutral character, extreme whiteness, soft texture, fine particle size and high absorbency. If you manufacture a dentifrice, tablets, cosmetics or pharmaceuticals requiring precipitated chalk, there is a grade of SNOW TOP that will best serve your purpose. Write for illustrated booklet "Precipitated Chalk for American Industry".

Snow Top Precipitated Chalk

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STEEL PAILS (see PAILS, STEEL)

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International Nickel Co., 67 Wall St., N. Y.
Lukens Steel Co., Coatesville, Pa.
Republic Steel Corp., Republic Bldg., Cleveland, O.

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International Steel Wool Co., Springfield, Ohio
James H. Rhodes & Co., 157 W. Hubbard St., Chicago

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STORAGE TANKS (see TANKS, STORAGE, etc.)

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General Dyestuffs Corp., 435 Hudson St., N. Y.
Hummel Chemical Co., 90 West St., N. Y.
N. I. Malmstrom & Co., 147 Lombardy St., Brooklyn
Michel Export Co., 90 Broad St., N. Y.
National Aniline & Chem. Co., 40 Rector St., N. Y.
Procter & Gamble Co., Cincinnati
Richards Chem. Wks., Jersey City, N. J.
Sandoz Chemical Works, 61 Van Dam St., N. Y.
Jacques Wolfe & Co., Passaic, N. J.

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American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Atlantic Refining Co., 260 S. Broad St., Phila.
Eastern Industries, Inc., Ridgefield, N. J.
Emery Industries, 4300 Carew Tower, Cincinnati
Hercules Powder Co., Wilmington
Kali Mfg. Co., 1408 N. Front St., Philadelphia
National Oil Products Co., Harrison, N. J.
Richard Chemical Works, Jersey City, N. J.
Sandoz Chemical Works, 61 Van Dam St., N. Y.
L. Sonneborn Sons, Inc., 88 Lexington Ave., N. Y.
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Arthur C. Trask Co., 4103 S. La Salle St., Chicago
Wecoline Prods. Co., 15 E. 26th St., N. Y.
Jacques Wolfe & Co., Passaic, N. J.

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White Tar Co., Kearny, N. J.

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Pfaltz & Bauer, 350—5th Ave., N. Y.
Pylam Products Co., 799 Greenwich St., N. Y.
Richards Chemical Works, Jersey City, N. J.
Welch, Holme & Clark Co., Inc., 563 Greenwich St., N. Y.

SUPERHEATERS

Eureka Machine Co., 2601 Vega Ave., Cleveland
William Garrigue & Co., 9 S. Clinton St., Chicago
Alan Porter Lee, 136 Liberty St., N. Y.
Ernest Scott & Co., Fall River, Mass.
The Superheater Co., 60 E. 42nd St., N. Y.
Wurster & Sanger, Inc., 5201 Kenwood Ave., Chicago

SURGICAL SOAPS (see POTASH SOAPS)

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American Excelsior Corp., 1000 N. Halstead St., Chicago
American Soap & Washoline Co., Cohoes, N. Y.
Baums Castorine Co., 200 Mathews St., Rome, N. Y.
Champion Mfg. Co., 322 S. Erie St., Indianapolis, Ind.
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Cole Chemical Co., 22-14 37th Ave., L. I. City, N. Y.
Creco Co., Inc., Creco Bldg., Long Island City, N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
Higley Chemical Co., Dubuque, Iowa
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Hubman Supply Co., 225 N. 4th St., Columbus, O.
Hysan Products Co., 2560 Armitage Ave., Chicago
Frank Miller & Sons, 2250 W. 58th St., Chicago
North Coast Soap & Chem. Wks., Seattle, Wash.
Pacific Chem. Co., 1421 N. Main St., Los Angeles
Palmer Products, Inc., Waukesha, Wis.
Peck's Prods. Co., 5238 N. Second St., St. Louis
Pioneer Mfg. Co., Cleveland, O.
Port Huron Detergent Co., Port Huron, Mich.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Rochester Germicide Co., Rochester, N. Y.
Sanco Prods. Inc., Greenville, O.
Sanitary Floor Compound Co., 104 Railroad Ave., Paterson, N. J.
Jno. C. F. Snyder & Sons, Inc., 2304 N. 28th St., Phila.
Solshine Mfg. Co., 44 Brookline St., Cambridge, Mass.
Sweeping Compound Mnfrs. Co., of N. Y., 421 Broome St., N. Y.
Uncle Sam Chemical Co., 329 E. 29th St., N. Y.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago

SYNTHETIC DETERGENTS (see DETERGENTS, SYNTHETIC)

SYNTHETIC INSECTICIDE CONCENTRATES (see INSECTICIDE CONCENTRATES, SYNTHETIC)

TALL OIL (TALLOL)

Champion Paper & Fibre Co., Canton, North Carolina
Gottesman & Co., 22 E. 40th St., N. Y.
Industrial Chem. Sales Div., West Va. Pulp & Paper Co., 230 Park Ave., N. Y.
National Oil Prods. Co., Harrison, N. J.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
Welch, Holme & Clark Co., 563 Greenwich St., N. Y.

TALC

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Binney & Smith Co., 41 E. 42nd St., N. Y.
Blue Ridge Talc Co., Henry, Va.
Chas. B. Chrystal Co., 11 Park Place, N. Y.
A. C. Drury & Co., 219 East North Water St., Chicago
E. I. du Pont de Nemours Co., Wilmington, Del.
Eastern Magnesia Talc Co., Burlington, Vt.
Fezandie & Sperrle, 205 Fulton St., N. Y.
Georgia Talc Co., Asheville, N. C.
Goris & Arnstein, 37th & Racine Ave., Chicago
K. F. Griffiths & Co., 110 E. 42nd St., N. Y.
Hammill & Gillespie, 225 Broadway, N. Y.
Innis, Speiden & Co., 117 Liberty St., N. Y.

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H. W. Oliver Bldg. Pittsburgh, Pa.

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Los Angeles Talc Co., Los Angeles, Cal.
Natura Minerals Co., 108 W. 6th St., Los Angeles
Orbis Products Corp., 215 Pearl St., N. Y.
Pacific Coast Talc Co., Los Angeles, Cal.
R. F. Revson Co., 91—7th Ave., N. Y.
James H. Rhodes & Co., 157 W. Hubbard St., Chicago
H. H. Rosenthal Co., 25 E. 26th St., N. Y.
L. A. Salomon & Bro., 216 Pearl St., N. Y.
E. M. Sergeant Pulp & Chemical Co., Empire State Bldg., N. Y.
A. E. Starkie, 528 N. Cuyler Ave., Oak Park, Ill.
Tamms Silica Co., 228 N. LaSalle St., Chicago
Union Talc Co., 147 Nassau St., N. Y.
Charles A. Wagner Co., 809 Callowhill St., Phila.
Welch, Holme & Clark Co., Inc., 563 Greenwich St., N. Y.
Whittaker, Clark & Daniels, 260 W. Broadway, N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.
Wyodak Chemical Co., 4600 E. 71st St., Cleveland

TALLOW
(see also Brokers and Dealers)

Armour & Co., 1355 W. 31st St., Chicago
Belleville Rendering Co., Belleville, Ill.
Consolidated Rendering Co., 178 Atlantic Ave., Boston
Cudahy Packing Co., 111 W. Monroe St., Chicago
Darling & Co., 4201 S. Ashland Ave., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
Independent Mfg. Co., Bridesburg P. O., Phila.
Long Island Soap Co., 29 Bridgewater St., Brooklyn
Louisville Butchers' Hide & Tallow Co., Louisville, Ky.
National Oil Prods. Co., Harrison, N. J.
Willibald Schaefer Co., Foot of Bremen Ave., St. Louis
Werner G. Smith Co., 2191 W. 110th St., Cleveland
Swift & Co., Union Stock Yards, Chicago
Theobald Industries, Kearny, N. J.
Toledo Tallow Co., Toledo, Ohio
Waltham Tallow Co., Waltham, Mass.
Welch, Holme & Clark Co., Inc., 563 Greenwich St., N. Y.
Wilson & Co., Union Stock Yards, Chicago
Wilson-Martin Co., Swanson St., Phila.

TALLOW CHIP SOAP (see CHIP SOAPS)

TALLOW OIL
(see also Brokers and Dealers)

Armour & Co., 1355 W. 31st St., Chicago
Consolidated Rendering Co., 40 N. Market St., Boston
Cudahy Packing Co., 111 W. Monroe St., Chicago
Eastern Industries, Inc., Ridgefield, N. J.
W. C. Hardesty Co., 41 E. 42nd St., N. Y.
Independent Mfg. Co., Bridesburg P. O., Phila.
Toledo Tallow Co., Toledo, O.
Waltham Tallow Co., Waltham, Mass.
Welch, Holme & Clark Co., Inc., 563 Greenwich St., N. Y.
Wilson & Co., Union Stock Yards, Chicago

TANKS (Glass Lined Mixing and Storage)

Alsop Engineering Corp., 100 High St., Milldale, Conn.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Products Co., 15 Park Row, N. Y. (Used)
Edge Moor Iron Wks., 30 Rockefeller Plaza, N. Y.
Ertel Engineering Co., Kingston, N. Y.
Filter Paper Co., 57 E. 24th St., Chicago
Littleford Bros., 453 E. Pearl St., Cincinnati
Metal Glass Products Corp., Belding, Mich.
Mixing Equipment Co., 1067 Garson Ave., Rochester, N. Y.
Pfaudler Co., 89 East Ave., Rochester, N. Y.
Scientific Filter Co., 1 Franklin Sq., N. Y.
Sprout, Waldron & Co., Muncy, Pa.

TANKS (for Liquid Soap Dispensing Systems)

Ampion Corp., 4-88—Forty-seventh Ave., L. I. City, N. Y.
Bobrick Mfg. Corp., 15 E. 26th St., N. Y.
Brighton Copper Works, 2163 Western Ave., Cincinnati
Clifton Chemical Co., 247 Front St., N. Y.
Eagle Soap Corp., Huntington, Ind.
Fuld Bros., Inc., 702 S. Wolfe St., Baltimore
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago
Moore Brothers Co., 67 Vestry St., N. Y.
Palmer Products, Inc., Waukesha, Wis.
Rochester Germicide Co., Rochester, N. Y.
John Trageser Steam Copper Works, Grand Ave., Maspeth, L. I., N. Y.
West Disinfecting Co., Long Island City, N. Y.

TANKS (Steel Mixing and Storage)

Alloy Prods. Corp., 221 Madison St., Waukesha, Wis.
Alsop Engineering Corp., 100 High St., Milldale, Conn.
S. F. Bowser & Co., 1300 E. Creighton Ave., Ft. Wayne, Ind.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
Edge Moor Iron Wks., 30 Rockefeller Plaza, N. Y.
Filter Paper Co., 57 E. 24th St., Chicago
William Garrigue & Co., 9 S. Clinton St., Chicago
Graver Tank & Mfg. Corp., 28 E. Jackson Blvd., Chicago
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 259—46th St., Brooklyn
Illinois Steel Corp., 208 S. LaSalle St., Chicago
Lancaster Iron Works, 564 S. Prince St., Lancaster, Pa.
J. M. Lehmann Co., 248 W. Broadway, N. Y.
Littleford Bros., 453 E. Pearl St., Cincinnati
Lukens Steel Corp., Coatesville, Pa.
Mixing Equipment Co., 1067 Garson Ave., Rochester, N. Y.
Patterson Foundry & Machine Co., East Liverpool, Ohio
Petroleum Iron Works, Sharon, Pa.
Pfaudler Co., Rochester, N. Y.
Pioneer Tank & Boiler Co., Tulsa, Okla.
Read Machy. Co., York, Pa.
Sprout, Waldron & Co., Muncy, Pa.
Struthers-Wells-Titusville Corp., Warren, Pa.
John Trageser Steam Copper Works, Grand St., Maspeth, L. I., N. Y.

TANKS (Wooden Mixing and Storage)

Atlantic Tank & Barrel Co., North Bergen, N. J.
Brill Equipment Corp., 183 Varick St., N. Y. (Used)
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
General Tank Corp., 30 Church St., N. Y.
Hauser-Stander Tank Co., Ivorydale, Cinn.
Kalamazoo Tank & Silo Co., Kalamazoo, Mich.
New England Tank & Tower Co., Everett, Mass.
Pacific Tank & Pipe Co., 334 Market St., San Francisco
Read Machy. Co., York, Pa.
Sprout, Waldron & Co., Muncy, Pa.
Tippett & Wood, Phillipsburg, N. J.

TAR ACID OIL (see COAL TAR RAW MATERIALS)

TAR ACIDS, High-Boiling

American-British Chem. Supplies, Inc., 180 Madison Ave., N. Y.
Barrett Co., 40 Rector St., N. Y.
S. H. Bell Co., 1407 Gulf Bldg., Pittsburgh
E. I. du Pont de Nemours Co., Wilmington, Del.
James Huggins & Son, 239 Medford St., Malden, Mass.
Wm. E. Jordan & Bro. 2590 Atlantic Ave., Brooklyn
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
Monsanto Chemical Co., St. Louis
Neville Co., Pittsburgh
Reilly Tar & Chem. Co., Indianapolis

TERPENELESS OILS (see ESSENTIAL OILS)

TERPENYL ACETATE (see AROMATIC CHEMICALS)

TERPINEOL
(see also Essential Oils)

van Ameringen-Haebler, Inc., 315 Fourth Ave., N. Y.
Aromatic Products, Inc., 15 E. 30th St., N. Y.
Dodge & Olcott Co., 180 Varick St., N. Y.

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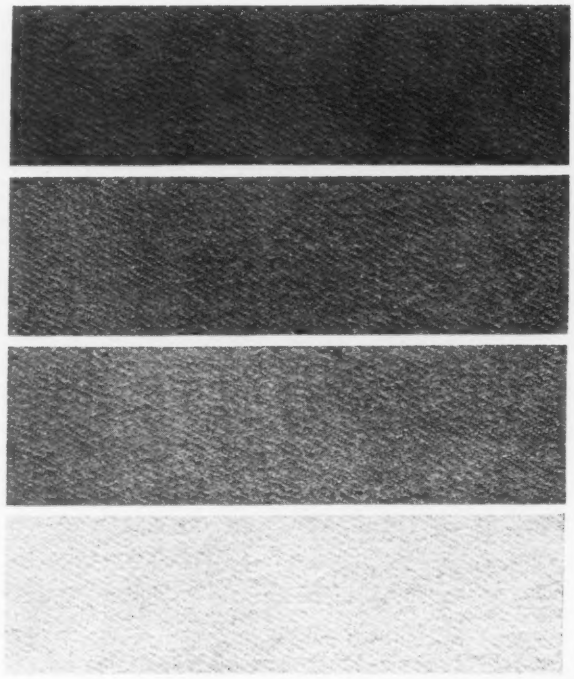

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Victor Chemical Works, 141 W. Jackson Blvd., Chicago, Ill.

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Felton Chemical Co., 603 Johnson Ave., Brooklyn, N. Y.
Firmenich & Co., 135—5th Ave., N. Y.
General Drug Co., 644 Pacific St., Bklyn.
Givaudan-Delawanna, Inc., 330 W. 42nd St., N. Y.
Hercules Powder Co., Wilmington
Magnus, Mabee & Reynard, 16 Desbrosses St., N. Y.
Ungerer & Co., 13 W. 20th St., N. Y.

TETRACHLORETHYLENE (see SOLVENTS, ORGANIC)

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Blockson Chemical Co., Joliet, Ill.
E. I. du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
A. R. Maas Chem. Co., South Gate, Calif.
Monsanto Chemical Co., St. Louis
Rumford Chem. Wks., Providence, R. I.
Victor Chem. Wks., 141 W. Jackson Blvd., Chicago
Warner Chemical Co., 405 Lexington Ave., N. Y.

TEXTILE SOAPS

American Soap & Washoline Co., Cohoes, N. Y.
Armour Soap Wks., 1355 W. 31st St., Chicago
Beach Soap Co., Lawrence, Mass.
Chemical Mfg. & Dist. Co., Easton, Pa.
Clifton Chemical Co., 247 Water St., N. Y.
Colgate-Palmolive-Peet Co., Jersey City, N. J.
Crystal Soap & Chemical Co., 6300 State Rd., Phila.
Delta Chem. Co., 4 Payson Ave., N. Y.
J. O. Draper Co., Pawtucket, R. I.
E. I. du Pont de Nemours Co., Wilmington, Del.
J. Eavenson & Sons, Del. & Penn Sts., Camden, N. J.
Enterprise Mill Soap Wks., 2231 N. 12th St., Philadelphia
Hockwald Chem. Co., 135 Mississippi St., San Francisco
Arnold Hoffman & Co., Providence, R. I.
Holbrook Mfg. Co., Cole & 18th Sts., Jersey City
Iowa Soap Co., 810 Valley St., Burlington, Ia.
Jungmann & Co., 157 Chambers St., N. Y.
H. Kohnstamm & Co., 91 Park Pl., N. Y.
Laurel Soap Mfg. Co., Tioga St., Phila.
Long Island Soap Co., Meeker Ave. & Bridgewater St., Brooklyn, N. Y.
Los Angeles Soap Co., Los Angeles, Cal.
Geo. E. Marsh Co., 200 Broadway, Cambridge, Mass.
National Oil Products Co., Harrison, N. J.
National Soap Co., 357 South 26th St., Tacoma, Wash.
Newell Gutradt & Co., 350 Fremont St., San Francisco
Procter & Gamble Co., Cincinnati
Puritan Soap Co., 573 Lyell Ave., Rochester, N. Y.
Rome Soap Mfg. Co., Rome, N. Y.
Sandoz Chemical Works, 61 Van Dam St., N. Y.
Scholler Bros., 3301 Amber St., Philadelphia
Geo. E. Sherman Co., 153 Classon Ave., Brooklyn, N. Y.
L. Sonneborn Sons, Inc., 88 Lexington Ave., N. Y.
John T. Stanley Co., 642 W. 30th St., N. Y.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn
Swift & Co., Union Stock Yards, Chicago
Ultra Chem. Wks., Inc., Wood & Shady Sts., Paterson, N. J.
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
M. Werk Co., St. Bernard, Cincinnati
Jacques Wolf & Co., Passaic, N. J.
Chas. W. Young & Co., 1247 N. 26th St., Phila.

TEXTILE SODA (see SODA)

TEXTILE SPECIALTIES (Oils, softeners, etc.)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
Chemical Marketing Co., 10 E. 40th St., N. Y.
J. O. Draper Co., Pawtucket, R. I.
E. I. du Pont de Nemours Co., Wilmington, Del.
Enterprise Mill Soap Wks., 2231 N. 12th St., Philadelphia
Franklin Research Co., 5134 Lancaster Ave., Phila.
Arnold Hoffman & Co., Providence, R. I.
Laurel Soap Mfg. Co., Tioga St., Phila., Pa.
Michel Export Co., Inc., 90 Broad St., N. Y.
Napthole, Inc., 15 E. 26th St., N. Y.
National Aniline & Chem. Co., 40 Rector St., N. Y.
National Oil Products Co., Harrison, N. J.
National Soap Co., 357 South 26th St., Tacoma, Wash.
National Starch Prods. Co., 820 Greenwich St., N. Y.
Sandoz Chemical Works, 61 Van Dam St., N. Y.
Scholler Bros., 3301 Amber St., Philadelphia
Geo. E. Sherman Co., 153 Classon Ave., Brooklyn, N. Y.
L. Sonneborn Sons, Inc., 88 Lexington Ave., N. Y.
Ultra Chem. Works, Inc., Kitay Bldg., Paterson, N. J.
Jacques Wolf & Co., Passaic, N. J.
Chas. W. Young & Co., 1247 N. 26th St., Phila.

THALLIUM SULFATE (Rat Poisons)

Foote Mineral Co., 1609 Summer St., Phila.
Hugo Falck & Co., 25 Broadway, N. Y.
Jungmann & Co., 157 Chambers St., N. Y.
Ore & Chemical Corp., 80 Broad St., N. Y.
Pfaltz & Bauer, Inc., 350—5th Ave., N. Y.

THEATRE SPRAY PERFUMES (see PERFUMING COMPOUNDS)

THEATRE SPRAYS

Antiseptol Co., 5524 Northwest Highway, Chicago
Baums Castorine Co., 200 Mathew St., Rome, N. Y.
Cenol Co., 4250 N. Crawford Ave., Chicago
Chemical Compounding Corp., 262 Huron St., Brooklyn
Chemical Mfg. & Dist. Co., Easton, Pa.
Chemical Supply Co., 2450 Canal Rd., Cleveland
Chicago Sanitary Prods. Co., 3100 S. Throop St., Chicago
Churchill Mfg. Co., Galesburg, Ill.
Clifton Chemical Co., 247 Front St., N. Y.
Delta Chemical Co., 4 Payson Ave., N. Y.
Eagle Soap Corp., Huntington, Ind.
Elkay Products Corp., 323 W. 16th St., N. Y.
Fuld Bros., 702 S. Wolfe St., Baltimore
James Good, Inc., Kensington, Philadelphia
Higley Chemical Co., Dubuque, Iowa
Hockwald Chemical Co., 135 Mississippi St., San Francisco
Hunt Mfg. Co., Lisbon Rd., Cleveland
Jansen Soap & Chemical Co., 324 Leavenworth St., San Francisco, Cal.
Lewis Soap & Chem. Co., 2210 San Pablo Ave., Oakland, Cal.
Palmer Products, Inc., Waukesha, Wisc.
Theo. B. Robertson Prods. Co., 700 W. Division St., Chicago
Rochester Sanitary Prods. Co., 874 Seward St., Rochester, N. Y.
Selig Co., 336 Marietta St., Atlanta, Ga.
J. A. Tumbler Labs., 423 Hanover St., Hanover
Uncle Sam Chem. Co., 329 E. 29th St., N. Y.
U. S. Sanitary Specialties Corp., 435 S. Western Ave., Chicago
Victory Chem. Co., 148 Fairmount Ave., Phila.
World Spray Co., Inc., 5117 Central Ave., Los Angeles

THERMOMETERS (see INSTRUMENTS)

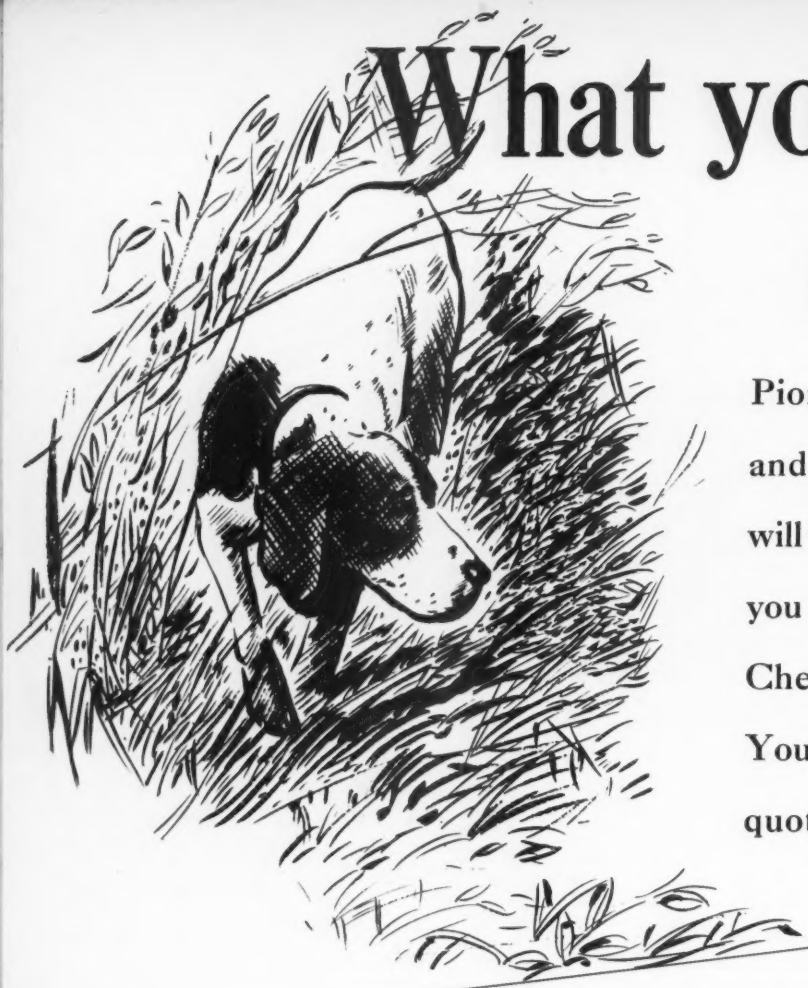
THYME OIL (see ESSENTIAL OILS)

THYMOL (see AROMATIC CHEMICALS)

TIGHT WRAPPING MACHINERY (see WRAPPING MACHINERY)

TIN CRYSTALS (Stannous Chloride)

American Cyanamid & Chem. Corp., 30 Rockefeller Plaza, N. Y.
J. T. Baker Chem. Co., Phillipsburg, N. J.
E. I. du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Metal & Thermit Corp., 120 Broadway, N. Y.



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Titanium Pigment Co., 111 Broadway, N. Y.
Wishnick-Tumpeer, Inc., 295 Madison Ave., N. Y.

TOILET PAPER

Brown Co., Portland, Me.
Hoberg Paper & Fibre Co., Green Bay, Wis.
Scott Paper Co., Chester, Pa.
Straubel Paper Co., Green Bay, Wis.
U. S. Envelope Co., Lititz, Pa.
Victoria Paper Mills Co., Fulton, N. Y.

TOILET PREPARATIONS
(see also Bath Salts, Shampoos, etc.)

Commercial Labs., Newark, N. Y. State
R. Gesell, Inc., 200 W. Houston St., N. Y.
Lightfoot Schultz Co., 1412 Park Ave., Hoboken, N. J.
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
Shores Co., Cedar Rapids, Ia.
John T. Stanley Co., 642 W. 30th St., N. Y.
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

TOILET SEAT COVERS

Lorco Industries, Clarke & Hornet Sts., Cincinnati
Morton Mfg. Co., 5105 W. Lake St., Chicago
National Towel Bendon Ltd., 12 Stewart St., San Francisco
Sani-Gard Cover Co., 411 W. 5th St., Los Angeles

TOILET SOAP BASE (for CAKES)

Armour Soap Wks., 1355 W. 31st St., Chicago
Colgate-Palmolive-Peet Co., Jersey City, N. J.
Hewitt Soap Co., Dayton, O.
Los Angeles Soap Co., Los Angeles, Cal.
Procter & Gamble Co., Cincinnati
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
Swift & Co., Chicago
John T. Stanley Co., 642 W. 30th St., N. Y.
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

TOILET SOAP MILLS (see SOAP MACHINERY)

TOILET SOAPS (Cakes)

Armour Soap Wks., 1355 W. 31st St., Chicago
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Colgate-Palmolive-Peet Co., Jersey City, N. J.
Cudahy Packing Co., 221 N. LaSalle St., Chicago
J. Eavenson & Sons, Del. & Penn Sts., Camden, N. J.
Hewitt Soap Co., Dayton, O.
Long Island Soap Co., 29 Bridgewater St., Brooklyn
Lightfoot Schultz Co., 1412 Park Ave., Hoboken, N. J.
Los Angeles Soap Co., Los Angeles, Cal.
National Soap Co., Box 1613, Tacoma, Wash.
Newell, Gutradt Co., 350 Fremont St., San Francisco
North Coast Soap & Chem. Wks., Seattle, Wash.
Procter & Gamble, Cincinnati
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
John T. Stanley Co., 642 W. 30th St., N. Y.
Swift & Co., Chicago
Vliet Soap Co., 638 Monroe St., Brooklyn
Warren Soap Mfg. Co., 51 Waverly St., Cambridge, Mass.
M. Werk Co., St. Bernard, Cincinnati
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

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Commercial Laboratories, Newark, N. Y. State
R. Gesell, Inc., 200 W. Houston St., N. Y.
McKesson & Robbins, 3674 3rd Ave., N. Y.
Geo. A. Schmidt Co., 236 W. North Ave., Chicago
Shores Co., Cedar Rapids, Ia.
Strong Cobb & Co., Cleveland
Allen B. Wrisley Co., 6801 W. 65th St., Chicago

TOWELS, PAPER (see PAPER TOWELS)

TRICHLORBENZENE (see SOLVENTS, ORGANIC)

TRICHLORETHYLENE (see SOLVENTS, ORGANIC)

TRIETHANOLAMINE

Carbide & Carbon Chemicals Corp., 30 E. 42nd St., N. Y.

TRIPOLI (see ABRASIVES and FILLERS)

TRIETHANOLAMINE SOAPS

Clifton Chemical Co., 247 Front St., N. Y.
Crystal Soap & Chemi. Co., 6300 State Road, Phila.
Fuld Bros., Inc., 702 S. Wolfe St., Baltimore
James Good, Inc., 2116 E. Susquehanna Ave., Phila.
Kranich Soap Co., 60 Richards St., Bklyn.
National Oil Prods. Co., Harrison, N. J.
Superior Soap Corp., 121 Nostrand Ave., Brooklyn

TRISODIUM PHOSPHATE
(see also Brokers and Dealers)

Amer. Agricultural Chem. Co., 50 Church St., N. Y.
American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y.
Blockson Chemical Co., Joliet, Ill.
E. I. du Pont de Nemours & Co., Wilmington, Del.
General Chemical Co., 40 Rector St., N. Y.
Harshaw Chemical Co., 1945 E. 97th St., Cleveland
International Agricultural Corp., Atlanta, Ga.
A. R. Maas Chem. Co., South Gate, Calif.
Monsanto Chemical Co., 1724 S. 2nd St., St. Louis
Rumford Chem. Wks., Rumford, R. I.
Victor Chemical Works, 141 W. Jackson Blvd., Chicago
Virginia-Carolina Chemical Corp., Richmond, Va.
Warner Chemical Co., 405 Lexington Ave., N. Y.

TRUCKS (Portable)

American Car & Foundry Co., 30 Church St., N .Y.
Consolidated Prods. Co., 15 Park Row, N. Y. (Used)
J. H. Day Co., 1144 Harrison Ave., Cincinnati
Fairbanks, Morse & Co., 900 S. Wabash St., Chicago
Houchin Machinery Co., Hawthorne, N. J.
Huber Machine Co., 265 46th St., Brooklyn
G. B. Lewis Co., Watertown, Wisc.
Schwenk Safety Device Corp., 80 Broad St., N. Y.
Self-Lifting Piano Truck Co., Findlay, Ohio

TUBE FILLING MACHINERY (see FILLING MACHINERY, TUBES)

TUBES (Collapsible)

Aluminum Company of America, Gulf Bldg., Pittsburgh Pa.
Art Tube Co., Irvington, N. J.
Bond Penn Tube Co., 501 Monroe St., Wilmington, Del.
Consolidated Fruit Jar Co., New Brunswick, N. J.
Continental Can Co., 100 E. 42nd St., N. Y.
Globe Collapsible Tube Corp., 28 Columbia Heights, Brooklyn, N. Y.
Hygienic Tube Co., 34 Ave. L., Newark, N. J. (Celluloid)
National Collapsible Tube Co., Providence, R. I.
New England Collapsible Tube Co., New London, Conn.
Peerless Tube Co., Bloomfield, N. J.
Sun Tube Corp., Hillside, N. J.
Victor Metal Products Corp., Brooklyn, N. Y.
White Metal Mfg. Co., 1012 Grand St., Hoboken, N. J.
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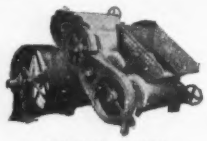

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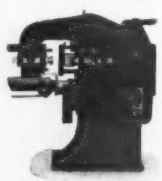
2—Automatic Soap Wrapping Machines.

Para Block Press

Perfection Crutcher



Automatic Soap Press

Standard Soap Frame

Crutchers	Foot and Automatic Soap Presses	Filter Presses
Soap Kettles	Cutting Tables	Soap Frames
Powder Mixers	Pulverizers	Powder Fillers
Granite Mills	Soap Pumps	Labellers
Plodders	Soap Chippers	Tanks
Slabbers		Boilers

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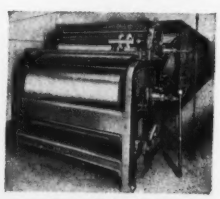

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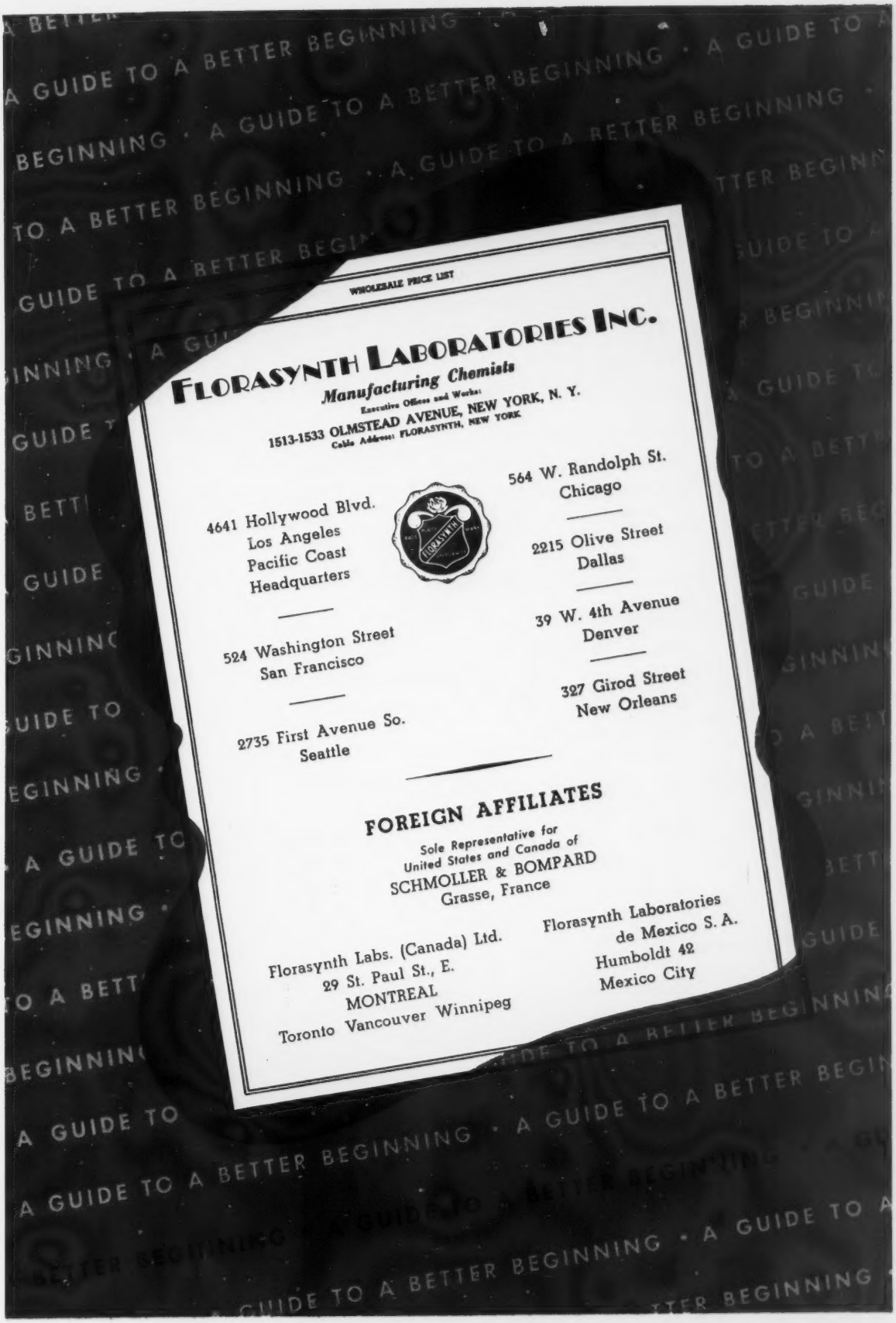
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Reference Section

	Page
COLD PROCESS SOAPS	127
SOAP PERFUMING	131
ADVERTISING CHECK LIST	148
FURNITURE AND AUTO POLISHES	153
FLOOR CLEANING	159
GLASS CLEANERS	163
EVALUATING INSECTICIDE ODORS	165
COMMENTS ON DRY MIXING	167
SPECIFICATIONS	169
SOAP BUYING HABITS	185
N.A.I.D.M. SPECIFICATIONS	187
F.D.A. METHOD	189
PEET-GRADY METHOD	197
THE SEIL METHOD	202
GNADINGER-CORL METHOD	205
ROTENONE DETERMINATION	207
MERCURY REDUCTION METHOD	208
ASSOCIATION OFFICERS	214
SOAP AND SANITARY CHEMICALS INDEX	217

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Cold Process Soaps*

COLD process soaps are often said to be the simplest of all soaps to make, but while the method itself is simple enough, there are many traps for the unwary and inexperienced. The chief advantages of the process are as follows:—much less elaborate plant required than for boiled or milled soaps; a saving of time, steam and labor; rapid turnover of raw materials; and the possibility of including large amounts of mineral salts, etc.

As against all this, the cold process soapmaker is obliged to use only the best grades of raw materials. He cannot recover the glycerine, and, unless he has become adept in the art of making a good cold-made soap, he will be faced with such problems as incomplete saponification, dirty or discolored soap, rancidity, perfuming and coloring difficulties, and the task of disposing of considerable quantities of scrap.

To minimize these potential losses, the selection of satisfactory raw materials must be given the closest attention. Oils and fats must if necessary be cleaned and bleached before use. In addition, they should be of the purest and freshest grades obtainable. Formerly only coconut and palm kernel oils were commonly saponified by the cold process, sometimes with a small proportion of olive or castor oil, but nowadays use is also made of tallow, lard, cottonseed oil, best quality bone fat, peanut, sesame and palm oils, and also high-grade rosin. The addition of up to 5 per cent of mineral oil to the fat charge has been claimed to improve the resulting texture, although personally I do not agree with this view.

Best mutton tallow of free fatty acid content of less than 3 per cent may be used. Also similar high grades of coconut oil. Up to 2 or 3 per cent f.f.a. is permissible, in fact the presence of a little fatty acid is probably an advantage, as this combines immediately with the caustic alkali, to form a small amount of soap which in turn acts as an emulsifier and facilitates mixing. Addition of small proportions of emulsifying agents has been suggested, those proposed including yeast, casein and sulfo-products. During 1934, laboratory experiments on these lines led to the discovery that the addition of 0.6 per cent of ordinary soap (reckoned on the fat charge) in solution form, resulted in a marked increase in the speed of saponification.

However, when the free fatty acid content of the oil charge is excessive, granules of soap grain out, occluding oils and lye, causing lack of homogeneity and the formation of lumps. This condition, known as "bunching" is frequently the cause of severe defects in the finished soap. Owing to the rapidity with which free acids are neutralized by caustic soda, the damage occurs right at the beginning of the process and even if the soap so formed is present only in traces, unwelcome phenomena such as grittiness and discoloration may occur. The only real solution to this problem is to confine one's attention to the highest grade fats and oils or else to pre-treat them with a little soda ash and salt before use, skimming off the pure fat after allowing the soda and free fatty acids to react and sink to the bottom of the kettle.

Above all, when working with the cold process, it is essential to remember that there is no possibility of removing color, odor or foreign material once saponification has taken place. Fats should therefore be freshly melted and strained before use. It goes without saying that the caustic alkalis also should be of standard high grade, as free as possible from heavy metals, solutions being made up fresh by dissolving in an iron tank with welded seams and reducing to the required density in a similar type of tank. It is often found desirable to use a small proportion of caustic potash as well as caustic soda, in the manufacture of cold-process soaps, as this tends to improve the texture and appearance of the finished product.

It is customary too in producing cold-made coconut oil soap to treat it with about 6 per cent less than the weight of alkali actually required by the saponification value (i.e. 50 per cent of its weight of 38° Be caustic soda lye). This naturally gives an incompletely saponified soap, but the unsaponified fat is probably present, not as ordinary tri-glycerides, but as mono- and di-glycerides. This means that in practice there is little if any difference between the lathering powers of a fully saponified coconut soap and a not quite completely saponified coconut soap made by the cold process.

In general, straight coconut and palm kernel oil soaps are irritant to the skin, unless superfatting agents such as lanolin and the like are also incorporated. For this reason alone there is a tendency to include other fats and oils in the charge, and to carry out saponification as completely as possible.

Temperatures play an important part in soapmaking by the cold method. Thus if the fat charge is too hot when the lye is added,

* Based on articles by J. M. Vallance in issues of *Soap and Sanitary Chemicals* for January and February, 1940.

complete emulsification often becomes impossible and the resulting soap is grey and unattractive. If the temperature is too low, the fats tend to solidify when the lye is added and the mass becomes too thick to work effectively. In the latter case, a little hot water may be added and vigorously crutched in until a smooth emulsion results, but obviously such water should not be added to excess.

Different combinations of fats and oils call for different working temperatures. Where, for example, a mixture of three parts of tallow to one part of coconut oil requires a temperature of about 105° F., a soap compounded of all coconut oil will work at 90-95° F. It is impossible to lay down hard and fast rules for the temperatures of mixed stock, as the mean solidifying point of two fats is seldom the solidifying point of the mixture.

Another factor to be taken into consideration is the addition of filling materials. This necessitates an adjustment in the temperature of the mixed fats, the process being worked at a somewhat higher temperature, in order to counteract the cooling effect of the filling agents.

It sometimes happens in cold weather that the congealing of the mass in the kettles gives the appearance of soap formation, with the result that the mass is prematurely filled off into the frames. Crutching with a handcrutcher in a warm room may in certain instances complete the process, but what is really needed is a jacketed kettle heated by water, steam or electricity. Such kettles are also useful if the mixing temperature proves to be too low.

The framing temperature is of particular importance, for the process begun in the kettle or crutcher is completed in the frames. It is therefore necessary to keep the mass in the frame warm for about 24 hours, this being accomplished either by wrapping the frames in woolen bags or sacks, or by wheeling them into a room kept to a constant temperature of 105-110° F. Afterwards, the frames may be allowed to stand for a further day or two at ordinary room temperature. If the framing temperature falls too low, a trough will form in the top of the soap, thus undesirably increasing the amount of scrap and wastage. If, on the other hand, the soap gets too warm in the frames it will either separate oil and lye or the surface will exhibit the phenomenon of "bowing." The contents may then be stirred with a wooden paddle or, in worse cases, the outside of the frames may be cooled with water.

The problem of framing temperatures automatically gives rise to a consideration of the size and shape of the frames. It is not advisable to exceed a capacity of 224-280 lb. for a cold-made soap frame. This is considered to be the absolute limit for satisfactory working, for with larger frames there is an increasing danger of excessive heat development. For the same reason, a frame that is too small may lose heat very rapidly, unless it is well wrapped up or kept into a warm room.

•

PHENOMENA of oxidation, such as discoloration and rancidity, are best prevented as far as possible, at the outset, by the careful selection of high-grade raw materials. Nevertheless, it is sometimes necessary to incorporate a suitable antioxidant. The most commonly used materials are sodium chloride and sodium hyposulfite. Certain writers have recommended the addition of derivatives of benzoic and p-hydroxbenzoic acid, but all tests go to show that these products are effective chiefly in acid media. Thymol, together with its isomers and essential oils containing them, should however, exert a favorable influence in this respect when incorporated in cold-made soap perfumes. The utility of stannous chloride was referred to at some length in a previous contribution ("Soap Discoloration: Its Avoidance," *Soap*, March, 1939.)

Common salt, in the proportion of one per cent or less, has been widely employed as a preservative for coconut and other cold process soaps, but it does of course tend to give a brittle soap, unless 1 or 2 per cent of rosin or superfatting agents such as lanolin, mineral oil or refined sperm oil are also incorporated.

Sodium hyposulfite solution has been found to be as effective as any preservative which can be added. One method of utilizing "hypo" is to dissolve 25 lb. of it in 17½ lb. hot water and to use about 7 oz. of this solution to every 100 lb. soap, the addition being made at the same time as the filling, coloring material and perfume are incorporated. Acid perfume oils, which set free a greyish deposit of sulfur, should not be employed in conjunction with hyposulfite. Contact with iron is also to be avoided, the solution itself being prepared in a vessel made of glass-lined or other resistant material, then stirred with a wooden paddle and strained through a close-mesh cloth.

The part played by rosin would appear to vary in accordance with the grade and quantity employed. Thus a small percentage of rosin is widely believed to inhibit the onset of rancidity, while the use of inferior rosin in a white soap, or the use of an excessive amount, is likely to cause darkening of cold-process soaps by reason of surface oxidation of the colophenic acids present. In fact, heavy proportions of rosin are sometimes deliberately incorporated, in order to give a brown soap of the Brown Windsor type. In the same category is the addition of about one per cent unbleached palm oil to the fat charge of a filled cold-made soap, the latter then bearing a superficial resemblance to the familiar yellow household soap. Care should be taken, in this case, to ensure that the palm oil contains the absolute minimum of free fatty acids, as otherwise bright yellow spots will form and thus ruin the batch. Incidentally, if a high proportion of rosin is employed, the semi-boiled variation of the process is desirable, the fat mix-

ture then being run into the lye to avoid the formation of lumps.

Reverting to the avoidance of discoloration, reference may be made to U. S. Patent 2,078,726, assigned to Best Foods, Inc. of New York. This aims at the prevention of the characteristic progressive yellowing of cold-made soaps (i.e. those based on coconut and palm kernel oils) by the utilization of partially hydrogenated oils of the same type. By this means, it is claimed the yellowing effect is substantially inhibited.

BUILDERS and fillers for cold process soaps include "liquoring" materials such as sodium silicate, potassium carbonate and soda ash solutions, brine, sugar and borax, and also insoluble products like talc, starch, bentonite, wilkinite and china clay. Cold-made soaps, and especially those based mainly on coconut oil, are capable of taking up large quantities of filling materials.

Up to 10 per cent of sodium silicate or 5 per cent soda crystals are reasonable maximums, although these proportions may easily be exceeded. Both exert a hardening effect, while the carbonate will effloresce to form an unsightly white powdery film on the surface of the cake if an excessive quantity is incorporated. Sodium silicate should as usual be rendered thoroughly alkaline before addition to the newly saponified mass.

Buffered sodium metaphosphate and sodium pyrophosphate deserve inclusion in good quality, lightly filled soaps by virtue of their ability to increase lathering power and disperse lime soaps. An addition of from 2 to 5 per cent of these materials is sufficient to effect such improvements in the finished product. Methyl cellulose has also been suggested as a filler and improver for use in cold-made soaps. The admixture of methyl cellulose is claimed to produce a fine-bubble lather.

China clay and bentonite, quite apart from their proven efficacy as colloidal detergents, possess also the useful ability of absorbing and neutralizing free alkali. That cold process soaps are either finished alkaline or else left with an excess of coconut oil is well known, and, in the former case, the emollient, lather-promoting and alkali-absorbing properties of china clay and bentonite should prove definitely valuable. A cold-made soap containing about 5 per cent of Cornish china clay is less likely to contain free fatty acids or free alkali.

Bentonite, too, is useful in this respect, and may be made into a dispersion with hot water for subsequent addition to the soap. If such additions go beyond a certain critical limit, however, the proportion of soap and filler becomes unbalanced, with the result that the soap is salted out and the mixture spoiled. In any given kettle charge, careful experiment is desirable in order to ascertain the optimum proportion of china clay or bentonite that may be incorporated.

THE perfuming and coloring of cold process soaps involves chiefly stability of the materials used in the presence of heat and concentrated alkali. A considerable proportion of the perfume is liable to attack by the free alkali which remains in large excess in the soap mass for a considerable time, until it is completely bound with the fat after spontaneous heating. In this process the perfume frequently suffers, and for that reason only the most alkali-stable essential oils, synthetics and isolates should be employed. While such oils as geranium, palmarosa and sandalwood can be used in these soaps with little fear of unwelcome reactions, certain esters and aldehydes, etc., cannot be recommended. It is most desirable for the average soapmaker to purchase ready-made perfume compositions, guaranteed alkali-fast.

The same comment applies to dyestuffs, which should be stable to alkali and thoroughly dissolved in water, care being taken to filter out any specks of undissolved color. Insoluble colors, such as ultramarine blue, may also be incorporated, but unless these are well worked in, an undesirable mottling effect is apt to result. Chlorophyll is probably the most satisfactory green to withstand the strongly alkaline solution necessary for this type of process. Rhodamine reds, tartrazine and metanil yellows, naphthol orange, mandarin and disulfine blue, may all be used to good effect. Violets and browns are usually somewhat difficult, while naphthol green is sensitive to hot alkali and is partially decomposed thereby.

Other colors present no difficulty, but should a particular shade be required it is advisable to get the color manufacturer to do the job unless the exact nature of the colors to be mixed is known. Mysterious pink spots are likely to make their appearance if acid, basic or alkaline dyes are not kept to their class when blended. Generally speaking, dyestuffs are best made up in stock solutions, by boiling in water for a few minutes, and then straining through cloth. A small percentage of soda ash is frequently added. Apart from stability to alkali, other points to be considered when selecting a dyestuff for cold process soaps are fastness to light and concentration. It is particularly undesirable to incorporate so much dyestuff in a soap that the lather itself is colored. As to lightfastness, any mild deficiency in this respect may be overcome by wrapping the soap in waxed paper, packing it in cartons, etc.

THE utilization of cold process soap scrap is frequently one of the major difficulties with which the soapmaker is confronted. This is not the case if tubular metal frames are used, but when the ordinary frames are employed, it is practically impossible to keep down scrap to a low limit, even if maximum attention is given to slabbing, cutting and pressing.

With very skillful handling, soap cuttings can be included during saponification by the cold process,

but they can much more readily be incorporated in an occasional semi-boiled batch. If one can incorporate such scraps in a boiling kettle, so that the glycerine may be recovered, so much the better.

If boiling is not practiced, steam-jacketed kettles may be used to re-melt the scrap, but if filling material in the form of silicate has been incorporated, the re-melted batch must be kept on the alkaline side, as otherwise "bunching" will occur, due to the formation of silicic acid. If lumps form in this fashion, it is possible to disperse them by gradually adding further alkali with continual stirring, until there is a slight excess.

If there is no objection to a mottled soap, colored soap scrap may be added to a newly made frame of white cold process soap. Such scrap, evenly distributed, gives quite an attractive mottled effect. It is also possible to utilize cold-made soap scrap in relatively small quantities in the manufacture of milled toilet soap and of powdered soap. According to Knigge, coconut soap scrap is well suited for subsequent conversion into floating soap, 2 parts of the scrap being mixed with one part of water and the heated paste well beaten to incorporate air.

SHAVING soaps of good quality may be made by using the cold process. The method is essentially similar to that employed for ordinary potash soaps, while the formula usually differs chiefly by virtue of a higher content of caustic potash lye and the addition of double-pressed stearic acid and added glycerine. The mixing in the crutcher or processing kettle should be extremely thorough, but the stirring device should run slowly and be designed with the object of avoiding frothing of the soap mass.

In modern factories, glass-lined, monel, nickel-plated or stainless steel equipment is used for this class of work. By observing due precautions, however, non-rusting iron kettles will serve quite well, but over-heating of the melted stearin must be avoided and the addition of alkali commenced as soon as possible, so that the free stearic acid does not contact the iron sides of the kettle for any length of time.

Cold-made shaving soaps are sometimes cut direct from the matured blocks, for the cheaper class of trade, but otherwise the blocks, after being stored for one or two weeks, should be chipped, dried upon stretched fabric in heated cupboards, then milled and plodded in the usual way. Regular soap base is sometimes added to them in the amalgamator, in order to modify the consistency.

As W. H. Simmons has pointed out, cheaper qualities of transparent soap are made by the cold process, with or without the aid of castor oil and alcohol, and with the assistance of glycerine and sugar. Thus for a small batch, 56 lb. Cochin coconut oil and 56 lb. edible tallow may be taken, melted at 130° F. and carefully strained into a small, steam-jacketed kettle. These materials must be of the highest quality and perfectly clean. Then 23 lb. C. P. glycerine and 56 lb. caustic soda solution (38° Be) are crutched in. The alcohol, which would amount to about 45 lb. is subsequently added. The batch must be intimately mixed, and the kettle covered and allowed to remain for about 1½ hours. Saponification ensues and, on completion, the soap is filled into narrow frames and allowed to cool rapidly. When quite cold throughout, the blocks are stripped and allowed to stand exposed for a few hours before slabbing. The transparency of such soaps shows a progressive improvement, which may be further enhanced by gently polishing the pressed cakes with a clean rag moistened with alcohol.

Pumice soaps, known also as mechanic's hand soaps, are frequently made merely by incorporating powdered pumice in a cold process soap based on coconut oil and mutton tallow, the pumice being mixed with the melted fat prior to the addition of lye. Filling materials such as silicate, sugar solution, etc., may also be incorporated, while the addition of a proportion of bentonite has been suggested, not only in order to facilitate the uniform dispersion of the pumice throughout the soap but also to retard the sweating out of glycerine that seems to occur in cold, damp weather. For this purpose, the bentonite may be mixed intimately with the pumice powder, prior to the incorporation of the latter in the fat charge.

Cold-made floating soaps formerly consisted of re-melted coconut soap scrap added to hot water and beaten up with a whisking device, in order to include air bubles, until the original volume was doubled. The mass was then carefully poured into small frames about 6 inches deep. Apart from any other consideration, this method obviously involved difficulty in pressing. The addition of 0.03 to 0.05 per cent powdered aluminum to form minute hydrogen bubbles in a cold-made soap was fully described by F. U. Blumenthal in an article appearing in the July, 1935 issue of *Soap*.

Soap Perfuming

By Philip Chaleyer

SINCE the last article about "Soap Perfuming" which was published in SOAP in 1933, and reprinted in the 1934 edition of the SOAP BLUE BOOK, we have had so many requests for reprints of this material from all over the world, that it has been decided to bring it up to date in the light of new developments in present day soap perfuming. Undoubtedly this is a large undertaking for one person, but if our readers will, after reading this article, write in their own experiences and ideas it will make the effort worthwhile, and be of decided benefit to the industry.

As in the last article no attempt will be made to give any "perfume for soap" formulae for they are generally worthless, but instead the emphasis will be put upon giving the perfumer common sense rules for building up such formulae, leaving the full initiative to the perfumer, where it actually belongs, in the choice of the ingredients he wants to use to reproduce or create particular types of odors. But before going deeply into the subject, we want to repeat some rules that remain as true today as they were yesterday and that every soap perfumer should keep in mind if he wants to make good soap perfumes.

1st. Generally one gets only what he pays for. It is useless to try to make a high grade soap perfume with ingredients of poor quality, and it is just as bad practice to put a good perfume in a soap of poor quality as to put a poor perfume in a good soap.

2nd. Buying cheaply is not necessarily buying wisely and when buying merchandise below standard cost prices one always sacrifices quality.

3rd. Expensive but powerful aromatic chemicals or essential oils are very useful and when diluted at the proper concentration are not more expensive to use than the regular run of products used in soap perfuming.

4th. Pure white soap is not necessarily the best soap and by advertising white soaps to the public, soap manufacturers make the problem of perfuming soaps more complicated and in the end limit the range and number of odors that could otherwise be offered.

5th. Every soap perfume is in itself a different problem, and a perfume blend which is good for a soap of a certain composition is not necessarily good in other soaps.

6th. The testing of the finished perfume mixture in the particular soap in which it is going to be used is the only way to judge whether the perfume in the soap will stand the test of time.

7th. The study of anti-oxidants and stabilizers in soap is extremely important, and many products considered unstable in soaps have been found satisfactory when used in conjunction with the proper stabilizer.

8th. Before incriminating the perfumer when a perfumed soap gives trouble, careful investigation of the soap itself and of its process of manufacture should be made, as often small causes such as traces of iron rust in a drum or kettle, traces of alkalinity in the soap, etc., may affect a perfume that would be satisfactory when used under ordinary conditions. In this respect the following causes of discoloration have been referred to in various publications.

(a) Electro-chemical formation of black tin monoxide and metallic tin in soft soaps packed in tin cans.

(b) The application to soaps of embossed copper seals or metal foils.

(c) Storage of esters, aldehydes, phenols, etc. for soap perfuming in iron or tin drums may result in spotting. Reaction with the metal of the containers in the course of such storage may introduce unsuspected impurities into the finished soap.

(d) The incorporation of air in floating soaps makes them more susceptible to rancidity, according to Thomssen and Kemp, the rancidity commonly exhibiting itself in the form of yellow discoloration.

(e) The same authors warn that when soap is bleached in the kettle, instead of using pre-bleached soap stock, darkening may sometimes occur.

(f) They also cite improper procedure in the addition of remelted scrap to soap as a possible cause of discoloration.

(g) Over rapid drying may occasionally cause trouble.

(h) Colophenic acids present in rosin are the prime cause of discoloration in heavily rosined soaps. It should be remembered that very often rosin or similar worthless resins are added to so-called soluble resins or resinoids which are offered at low prices.

(i) A large soap company has found that traces of copper as low as one part to forty million have a detrimental effect on soap perfumes, and for this reason a large aromatic chemicals manufacturer has all his products tested for copper before releasing them on the market.

9th. A good background of crystalline substances or natural odoriferous gums is still the best way to obtain soap perfumes that are stable and lasting.

10th. Colorless gums and resins are useful as fixatives when no other kind can be used for fear of discoloration.

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11th. It is a good thing before adopting a new product or before changing a source of supply to test the product in soap to be sure to obtain comparative results, as chemical analysis alone will not tell the whole story.

12th. Certain perfume ingredients behave very differently when used alone or used in a mixture, and certain products which are unstable when used alone may become stable when mixed with other ingredients and in the same respect the reverse may be true.

If the above rules are applied the chances are that better soap perfumes will result. When speaking about perfuming soap, we generally mean milled soap as cheaper soaps are usually not perfumed very much. The rules set for milled soaps, however, can, to a certain extent, be applied to all other soaps.

Antioxidants and Stabilizers

Natural untreated fats contain natural "anti-oxygens" or "inhibitols" that prevent or retard rancidity in natural fats. These products are destroyed to a great extent by modern refining and bleaching methods, as has been demonstrated by Moures, Dufraise, Hilditch, Olcott and many others. Since then intensive research to produce artificial anti-oxidants and fat stabilizers has been pushed during recent years not only in connection with soap manufacturing but also for use in the edible fat and margarine industry. One of the oldest soap and fat stabilizers can be found in the use of purified gum benzoin used by the manufacturers of flower extracts in Grasse, France, for the preparation of the fats which are used for the extraction of perfumes from flowers by the method called "Enfleurage."

Among the chemical anti-oxidants claimed to be successful or partly successful in soap, may be cited the most important: sodium hyposulfite, hydroquinone, "Sopanox," (trade marked product made by the Monsanto Chemical Company), parahydroxy benzoic acid derivatives, sodium benzoate, hexamethylenetetramine, stannous chloride, stannous oxide, sodium stannate and magnesium silicate. Stannous chloride has been used to improve color in soaps since 1900. Today this product is considered one of the most satisfactory soap anti-oxidants. H. P. Martin has defined the standard concentrated solution as one prepared by adding 35 parts of tin crystals to 25 parts of hot water to be strained before using. For toilet soaps, 6 ounces avoirdupois of this solution per 112 lbs. of soap chips gives approximately the 0.2 per cent of stannous chloride required to stabilize the finished soap. It is to be remembered that completely different results were frequently obtained with different anti-oxidants. Some substances have very specific stabilizing effects on certain fats and are inactive on others.

For more information on anti-oxidants we can refer our readers to *Schimmel Briefs* No. 50, May, 1939, as it would be too long to discuss the entire matter in this article. Not enough has been published on the action of certain aromatic chemicals and essential oils as soap anti-oxidants to draw decisive conclusions but, it has already been noticed according to the experiments carried out by F. Wittka (*Seifen Ztg.* 64, 1937, 194, 210) who dissolved from 0.1 to 10 per cent of different aromatic chemicals in vegetable oils, using castor and peanut oils, that after exposure to direct sunlight, using for comparison a counter type kept in obscurity, the following results were observed: Aromatic alcohols such as, benzyl alcohol, phenyl ethyl alcohol, phenyl propyl alcohol, cinnamic alcohol, have shown no change of odor even after considerable time of exposure to bright sunlight. In contrast to this, oxidation of these oils was speeded up considerably in the presence of 2 per cent safrol, isoeugenol or alpha ionone, which showed no action on the vegetable oil when the samples were kept in the dark. These aromatic alcohols proved effective as anti-oxidants even in quantities as low as 0.1 per cent.

For this reason it seems that aromatic alcohols are not only particularly well suited for perfuming soap, but probably have a stabilizing influence when mixed with other products. This would give a clue to the rules numbered 5, 6 and especially 12 mentioned previously. It would be very interesting to have this type of experiment continued in schools and universities and published for the benefit of the industry in general.

Fading of Perfumes in Soaps

Under the heading "Problems of Soap Perfuming," a very interesting reproduction of articles published originally in the *Givaudanian* was reproduced in the "*Soap Blue Book*" of 1939. In the *Givaudanian* this article was published under the caption "Perfume ingredients that give trouble in soap." (*Givaudanian*—September, October and November, 1938 and also "What not to do in Soap Perfuming" October, 1937.)

This series of articles is extremely interesting from the theoretical point of view and also as an explanation of the different reactions that may take place by the action of soap alkalinity, hydrolysis, action of ultra-violet rays, sunlight, soap oxidation, etc. . . . on soap perfumes, but luckily indeed for the soap perfumer these reactions are never complete, or rather take long enough to happen to prevent them from interfering with the sale of the soap, otherwise the list of products suitable for perfuming soaps would be rather small indeed, as such standard soap perfume ingredients as bergamot, linalol, terpineol, citronellol, phenyl ethyl alcohol, cinnamic alcohol, etc. . . . are stated as liable to give trouble in soap under certain conditions. This may be true, but if one should exclude all these products very few would be left to work with, and, in practice it does not seem that these are demonstrated facts. It seems that the different reactions described in this series of articles explains more the reasons for the change of odor and the fading of perfumes in soaps rather than prohibiting the use of these products in soap. Many perfumers have been using these products for years as we have done ourselves without much difficulty or complaint from the public.

Soap Perfumes

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It must also be mentioned that these products when used alone in soaps may give the type of reactions described in this article, but used in connection with anti-oxidants or stabilizers or other aromatic products acting as such, these reactions may not take place or would be sufficiently delayed to permit their use in soap without difficulty. In our opinion more actual experimenting has to be done along these lines before one can draw the proper conclusions.

Fixation of Soap Perfumes

One of the most important facts to remember in making perfumes, is that there exists no permanent fixative. A perfume is lasting not because it contains so much musk, or coumarin, or a high boiling point chemical, or resin or so-called fixative, but because all its ingredients are properly balanced and form a whole which evaporates at the same rate. It is unfortunate that no practical measuring apparatus has yet been devised to measure the rate of evaporation of certain perfume mixtures, as this would give very interesting data on the mechanism of perfume fixation. Up to now the process is empirical and rests upon the ability of the perfumer and the perfection of his sense of smell, which is as we know affected by so many adverse conditions. Until an artificial nose that will make possible these measurements is developed we must stick to what experience has taught us:

Rule No. 1—Each aromatic product contributes its own odor to the perfume ensemble and must be exactly proportioned.

Rule No. 2—High boiling odorless products are useless as fixatives and when introduced in a perfume mixtures have a tendency to make it heavy and lifeless.

Rule No. 3 — Crystals and odoriferous resins form the best lasting base for any perfume and resins such as oak moss, styrax, orris, balsam, perou, balsam tolu, opoponax, etc. . . . should form the base of all good soap perfumes.

Testing Perfuming Materials

Some years ago we tested a large number of aromatic chemicals and essential oils in soap. By popular request we are reproducing the results of these experiments at the end of this article. We have added a few more products and made several changes since it was first published. Although these results have been carefully checked, there may occur some discrepancies as to the accuracy of some of the tests. This often results from the fact that although the manufacture of aromatic chemicals has been greatly improved in the United States, there still exist differences of quality for the same product among the different manufacturers and particularly in the case of products subject to cause discoloration in soap such as heliotropine and musk xylene. We have found that under certain conditions these products will cause discoloration in soaps and under others they will not. For this reason, we will list them in the dubious column.

In the case of these two products an easy test may be useful. A few crystals of these materials are dissolved in alcohol, to this solution a few drops of a solution of caustic soda 10 per cent are added. If the musk contains impurities, a strong blue color is immediately produced which turns brown. If heliotropine is tested the solution turns brown. This same test can be made on other products, as the appearance of a discoloration in an alkaline solution will generally be a fair indication that the product tested will discolor white soaps, as soaps are always slightly alkaline or become alkaline in contact with water and react about the same way as a diluted solution of caustic soda.

In the case of essential oils we have endeavored to secure samples of the greatest purity, but this is not generally the case with commercial products that are frequently adulterated and irregular in quality. Moreover, essential oils also vary in quality according to climatic conditions, country of origin, methods and processes used for their production and storage, which may account for irregular results.

For instance, oil of lavender in aging develops acidity which attacks drums or cans in which the oil is stored and these traces of metallic salts may react on other perfume constituents and produce discolorations. This may also happen when the milling machine and kettles are not kept rigorously clean.

Terpenes or essential oils containing large amounts of terpenes such as lemon and orange, deteriorate very quickly in soaps unless skillfully and judiciously blended. Lemonene like pinene forms ozonides very readily. When this ozonide is formed it readily attacks any other unsaturated groups such as: cinnamic alcohol if this product is present in the same formula, thus rapidly destroying the characteristic odor and producing a browning of the soap mass and a turpentine-like odor. Soaps containing an excess of alkali (over 0.02 per cent) will also deteriorate perfumes very rapidly.

The quantity of perfume used in our experiments was 1 per cent of the quantity of soap stock used. In the case of crystalline or very viscous substances, we put them into solution with diethyl phthalate, four times their weight, in order to obtain a better diffusion of the product in soap, the percentage of odoriferous product remaining the same. The perfume was introduced in the soap in the regular way and milled twice through a small laboratory milling machine. The soap used in our experiments was regular white toilet soap stock and did not contain more than 0.02 free alkali. Two cakes of soap were set aside; one left in glassine paper, the other left unwrapped. Both were examined every week and for comparison, an unscented cake of the same soap was used as a standard.

We are presenting this data in five different groups:

1st Group: Essential Oils
2nd Group: Aromatic Chemicals
3rd Group: Soluble Resins
4th Group: Distilled Essences from Resins
5th Group: List of products which are soap fast and the best to use either in white or colored soaps.

This last group constitutes a convenient reference for use when one starts making a new soap perfume. For detailed information about any particular product, one can refer to the tables. The products listed in this group have a lasting coefficient of at least 30 in wrapped soaps and can be considered soap fast.

We have experimented with certain essential oils such as angelica seed, wormwood, etc., which are seldom used by soap perfumers, but deserve better recognition because of their great strength and stability in soaps. Their characters, though sometimes unusual, lend themselves to very excellent blends, and in their use, the ability and ingenuity of the perfumer may be exercised. We have found them to be conducive to very interesting results.

A few words of explanation are, we believe, necessary to understand the meaning of the different columns of the tables on the following pages.

First Column—*Discoloration*: It is extremely important to know when the product is to be used in a white soap. Discoloration due to accidental causes has naturally not been taken into account.

Second Column—*Change in Character of Odor*: Certain products after standing a certain length of time in soaps, change the character of their odors, through the combined action of alkalies and humidity always present in soap. For instance, terpenes take a turpentine-like odor, clove becomes sweet and loses its spicy character, which often brings a complete change in the final odor. We have thought it interesting to note this fact in column 2.

Third and Fourth Columns—*Lasting Index for Wrapped and Unwrapped Soaps*: These indexes represent the number of weeks at the end of which time the odor of the product tested has disappeared or is only very slightly noticeable in soap. It offers a very excellent point of comparison for lasting qualities among the different products tested. The maximum is 50 as we have limited our period of observation to 50 weeks.

Fifth Column—*Intensity of Odor*: In this column are described the intensity and quality of odor of products tested: strong, medium, sweet, weak, odorless.

Sixth Column—*Good for all Soaps*: This column notes the products that are sufficiently stable to be used in all soaps because they do not discolor. It does not mean that they are necessarily very lasting, but they are stable so far as character of odor and discoloration are concerned.

Seventh Column—*Good for Colored Soaps Only*: In this column we have listed products which are stable but cause discoloration in soaps and for this reason can only be used in colored soaps.

Useful information has been gathered for the column marked "Observations" in order to obtain the best results in blending the products under consideration.

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ESSENTIAL OILS IN MILLED SOAPS
(Group 1)

NAME OF PRODUCT	Discoloration	Change in character of odor	Lasting index wrapped	Lasting index unwrapped	Intensity of odor	Good for all soaps	Good for colored soaps	OBSERVATIONS
Almond Bitter Genuine	No	fades	10	5	strong	Yes	Yes	More lasting and better character than benzaldehyde should be associated with styrax soluble resin.
Angelica seeds or roots	No	very stable	50	30	medium	Yes	Yes	Aromatic type of odor too expensive to be used in soaps, but very stable.
Anise Oil	No	very stable	35	10	sweet	Yes	Yes	Sometimes used to give a sweet character to bouquet odors.
Basil	No	stable	30	10	aromatic sweet	Yes	Yes	Nice aromatic odor.
Bay	very light	fairly stable	40	10	spicy strong	Yes	Yes	Used mostly for shavnig cream odors.
Bergamot	No	stable	50	4	sweet mild	Yes	Yes	Very useful and very much used in bouquets of all kinds.
Birch Sweet	No	stable	30	10	aromatic sweet	Yes	Yes	Somewhat resembling wintergreen. Behaves the same way when not adulterated.
Bois de Rose	No	Very stable	50	10	sweet fresh	Yes	Yes	Recommended in all types of soaps.
Cade	No—but dark colored	None	50	50	strong	No	Yes	Used in medicated soaps as skin antiseptic, has strong natural coloration.
Calamus	No	stable	50	30	medium	Yes	Yes	Give light woody effects for chypre.
Camphor (white) sassafrassy	No	fading	10	2	strong	Yes	Yes	Used only in cheap mechanic's soaps but not lasting.
Cananga	No	stable	30	15	sweet	Yes	Yes	Much used in preference to ylang-ylang.
Caraway	No	stable	50	25	sweet	Yes	Yes	Should be used more often, blends well with lavender for chypre or fougere type of odors. Use sparingly.
Cassia	Yes Slightly	Changes slightly	25	10	spicy strong	No	Yes	Very useful for spicy bouquets. Is generally used in too small amounts to produce discoloration.
Cedarwood	No	fading	50	3	weak	Yes	Yes	Not much odor value but good fixative, odor weak but persistent. Used for viol, la vender. etc.
Cinnamon Leaf	Turns brown	fading change	20	4	spicy	No	Yes	Good for colored soap only but even for this purpose not very recommended as odor turns rapidly sweetish.
Citronella Java and Ceylon	No	fading	50	10	strong	Yes	Yes	Sometimes, and especially when exposed to air, odor turns acid and resinous on account of the polymerization of citronellal.
Cloves	Turns brown	fading changing	20	4	strong	No	Yes	Much used in colored soaps. We do not recommend the use of this product in white soap because of instability and tendency to discolor. Rather use pimento berries or other products spicy in character and more stable.
Coriander	No	fading	30	10	sweet	Yes	Yes	Very agreeable odor which can be fixed by the use of soluble resins.
Cumin	No	None	25	5	strong	Yes	Yes	Gives a refreshing odor when properly used as uplifter of odors.
Cypress	No	Turns turpentine	10	2	medium	No	No	Not recommended on account of change of odor.
Eucalyptus	No	None	50	10	aromatic medium	Yes	Yes	Good, blends especially well with lavender Use soluble resin benzoin and myrrh with it.
Galbanum distilled essence	No	fade slowly	50	20	aromatic strong	Yes	Yes	Too expensive to use in most soaps, but in small quantity gives interesting tones.
Geranium Bourbon	No	None	50	20	rosy strong	Yes	Yes	Excellent for all kinds of soaps.
Geranium African	No	None	50	20	rosy strong	Yes	Yes	Slightly different in color than the bourbon, gives a lighter odor.
Geranium Turkish Palma Rosa	No	None	50	30	rosy strong	Yes	Yes	Has a grassy odor but a sweet agreeable character.
Gingergrass	No	None	50	20	medium	Yes	Yes	Has a more pronounced grassy character, must be used sparingly.
Guiac Wood	No	None	50	50	very weak	Yes	Yes	Good as a fixative especially in rose type of odors.
Lavender	No	fading gradual	50	15	medium	Yes	Yes	One of the best and most used essential oils in perfume for soap, blends well with resinoid orris and oilbanum, oak moss, etc.
Lemon	No	turpentine like odor	6	1	fresh weak	Yes	Yes	It can be used and is used successfully by some soap perfumers. Unless expertly handled, however, it is not lasting enough to be recommended.
Lemongrass	Yellow brownish spots in sample tested	Turns resinous	12	1	fresh weak	No	Yes	Useful in low price soaps although it fades quickly. Sample tested gave discoloration.

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ESSENTIAL OILS IN MILLED SOAPS—Continued

NAME OF PRODUCT	Discoloration	Change in character of odor	Lasting index wrapped	Lasting index unwrapped	Intensity of odor	Good for all soaps	Good for colored soaps only	OBSERVATIONS
Limes distilled	No	turns turpentine	12	1	weak	—	—	Odor not generally interesting for soap although useful in small quantities in bouquets.
Limes expressed	Yes	fades gradually	25	5	fresh	Yes	Yes	Gives much better results than lemon for lemon type of odors but too expensive in price.
Linaloe	No	stable	50	3	sweet	Yes	Yes	More woody than linalool but has a similar odor.
Lovage	No	very stable	50	15	strong sweet	Yes	Yes	Peculiar odor suitable for bouquets. Very stable. Use sparingly.
Mace	No	stable	30	15	medium	Yes	Yes	Light spicy odor.
Marjoram	No	stable	15	3	—	Yes	Yes	Good for top note of perfume only.
Myrtle	No	stable	30	15	—	—	—	Resinous odor fairly stable.
Neroli genuine	No	fades	30	10	—	Yes	Yes	Impossible. to use on account of its price. if not genuine will discolor
Nutmeg	No	stable	30	15	—	Yes	Yes	For spicy odors.
Orange	No	turns terpenic	10	2	—	No	No	Not recommended because the odor is not lasting and turns bad too quickly.
Origanum	No	fades slowly	30	10	—	Yes	Yes	Behaves like oil of thyme, which it resembles.
Patchouly	No	No	50	50	strong	Yes	Yes	The oil has a dark brown color which may darken white soaps if used in large amounts but this oil is one of the best to use in soaps as odor is very lasting.
Peppermint	No	very stable	40	15	strong	Yes	Yes	Suitable for cologne type of odor. Very refreshing.
Petitgrain all qualities	No	fairly stable	50	20	medium	Yes	Yes	One of the best essential oils to use in soaps though it changes slightly in character of odor after standing.
Pimento	Yes	No	40	10	—	No	Yes	Colors, but not as much as clove.
Pine Needle Siberia	No	fades	20	10	medium	Yes	Yes	Not very lasting, turns terpenic at times, but can be used with resin olibanum as fixative.
Pinus Sylvestris	No	fades	10	5	—	No	No	Turns turpentine very quickly, not recommended.
Rosemary French	No	fading	30	10	strong	Yes	Yes	Very often adulterated with portions of Spanish. When pure is very agreeable as an odor.
Rosemary Spanish	No	fairly stable	25	10	strong	Yes	Yes	Turns slightly camphorish, often adulterated with turpentine which makes it turn more quickly.
Sage Dalmatian and Spanish	Yes	fairly stable	25	10	strong	No	Yes	Develops yellowish tint after standing 2 or 3 weeks.
Sandalwood E. I. or Australia	No	very stable	50	50	weak	Yes	Yes	Odor develops in soap after standing. One of the best oils to use for perfuming soaps.
Tansy	No	very stable	50	50	strong	Yes	Yes	Aromatic odor resembling wormwood useful in bouquet odor. Very stable.
Spearmint	No	very stable	50	50	strong	Yes	Yes	Useful in blended bouquets. Very stable.
Thyme red	No	changes gradually	40	15	strong	Yes	Yes	Agreeable aromatic odor usefu in cologne bouquets.
Thyme white	No	changes gradually	40	15	strong	Yes	Yes	Behaves like red thyme.
Verbena (true)	None	fairly stable	30	10	medium	Yes	Yes	Very scarce in U. S. A. Products sold are mostly imitations, unstable based upon citral. Very popular in France, must be blended with soluble resins.
Vetyvert Bourbon	None	perfectly stable	50	50	medium	Yes	Yes	Odor more woody than the Java but very excellent base for soap odors.
Vetyvert Java	None	perfectly stable	50	50	medium	Yes	Yes	More delicate than Bourbon in odor. Absolutely stable in soap.
Wormwood	Nc	very stable	50	50	strong	Yes	Yes	Very lasting and suitable for all soaps, interesting odor.
Ylang-Ylang	None	slowly fading	25	10	medium	Yes	Yes	The best quality of ylang-ylang to use is the grade called complete, which is rich in high boiling sesquiterpenes which are very stable in soap and prove very useful in floral soap odors.

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AROMATIC CHEMICALS IN MILLED SOAPS

(Group 2)

(* in front of product means good as anti-oxidant.)

NAME OF PRODUCT	Discoloration	Change in character of odor	Lasting index wrapped	Lasting index unwrapped	Intensity of odor	Good for white soap	Good for colored soap	OBSERVATIONS
Acetophenone	No	perfectly stable	50	40	strong	Yes	Yes	Blends well with labdanum soluble resin. Very stable and good for all soaps.
Fatty Aldehydes C8 to C12 Lauric	No	fading	10	4	strong at first	—	—	May be used to boost an odor in a wrapped soap, otherwise unsuitable. Not lasting enough.
Aldehyde Methyl Nonylacetic	No	fading	15	6	strong at first	Yes	Yes	Same observation as above. In combination with natural gums (labdanum) gives better results.
Aldehyde C14 Peach (Lactone)	No	fairly stable	20	10	sweet	Yes	Yes	Not extremely lasting but give good results in combinations of bouquet odors
Aldehyde C16 Strawberry (ester)	No	fairly stable	25	12	medium	Yes	Yes	
Amylcinnamic Aldehyde	No	stable	50	40	sweet	Yes	Yes	Some grades give slight yellow coloration in white soaps.
Anisic Alcohol	No	stable	50	40	weak	Yes	Yes	Is little used but deserves better consideration on account of stability.
Anisic Aldehyde from Anethol	No	fading	10	4	weak	Yes	Yes	Not recommended but may be useful in certain bouquets.
Anisic Acetate	No	fairly stable	25	15	sweet penetrating	Yes	Yes	Deserves better recognition by soap makers. Good in violet and gardenia types of odors.
Alcohols Fatty from C8 to C12	No	fairly stable	40	20	strong	Yes	Yes	Give much better results than aldehydes as they are more stable.
Amylphenyl Acetate	No	fairly stable	40	20	medium	Yes	Yes	Good for all soaps. Good for sweet honey-like odors.
Anethol	No	stable	40	20	sweet	Yes	Yes	Not very much used but deserves better attention. Good as a sweetener in bouquet odors and jasmin for soap.
Amyl Salicylate	No	stable	40	6	mild	Yes	Yes	Watch for discoloration with iron salts and dirty iron kettles, otherwise good in all soaps.
Amylic esters (low molecular weight) Acetate, butyrate, etc.	No	fading	10	1	sweet	Yes	Yes	Not very lasting, but good as a top-note in chypre and jasmin bouquets.
Benzaldehyde F.F.C.	No	fading	5	3	strong	Yes	Yes	If not absolutely F.F.C. will discolor. Odor not very lasting but may be useful in bouquets containing large amounts of soluble resins particularly benzoin and balsam peru.
Benzophenone	No	no	50	40	medium	Yes	Yes	To use as a fixative in rose and sweet bouquet odors. Very good.
Benzylidene Acetone	No	no	25	10	medium	Yes	Yes	Blends well with lavender odors. Use of this product should be discouraged as it is very irritating to the skin.
Benzylacetate	No	fading	30	4	medium	Yes	Yes	Indispensable for making floral odors. Soluble resins, particularly orris. Balsam peru and balsam tolu will help to make it lasting.
Benzylalcohol	No	no odor	0	0	none	Yes	Yes	Only used as an odorless solvent for resins or crystalline products.
Benzylbutyrate	No	fading	25	5	medium	Yes	Yes	Sweeter than benzylacetate, useful for jasmin odors. Should be used mixed with soluble resins.
Benzylcinnamate	No	no	30	10	weak	Yes	Yes	Used sometimes as a fixative.
Benzyl formate	No	unstable	10	2	strong but fades	No	No	Not recommended much except in special bouquets as it decomposes easily.
Benyzl propionate	No	fading	35	6	medium	Yes	Yes	To be used same as benzylacetate.
Borneol	No	slightly camphorish	50	25	medium	Yes	Yes	Useful for pine odors.
Bornylacetate	No	gets slightly camphorish	50	25	medium	Yes	Yes	Gets the camphorish odor of borneol after standing. Used in pine-needle odors.
Bromstyrol	slight yellow in light	turns acrid	50	6	strong but fading	No	Yes	Personally we do not like this product very much in soap as it takes on a disagreeable odor after standing and is very irritating to the skin.
*Benzylbenzoate	No	no odor	0	0	None	Yes	Yes	Used as anti-oxidant and solvent for musk and crystalline products.
Carvol	No	gradual	25	15	medium	Yes	Yes	Although little used, is very interesting in bouquet odors.
Cinnamic Alcohol	No	no	40	25	weak	Yes	Yes	Used for lilac odors in combination with styrax. Not very strong but brings valuable character to bouquets.
Cinnamic Aldehyde	Develops yellow spots	gradual fading	40	10	strong	No	Yes	Recommended as being satisfactory in many bouquets especially of the oriental type for colored soaps.

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Acetophenone
Aldehyde C-8
Aldehyde C-10
Aldehyde C-12M
Aldehyde C-14
Aldehyde C-16 100%
Aldehyde C-18 100%
Aldehyde C-20 (Raspberry Aldehyde)
Alpha Amyl Cinnamic Aldehyde
Amyl Salicylate (Trefol-Orchid)
Anisic Alcohol
Benzalacetone (Benzylidin Acetone)
B-Methyl Phenyl Glycidic Acid Ethyl Ester
Benzaldehyde, ffc.
Benzoic Acid Ethyl Ester
Benzoic Acid Methyl Ester
Benzophenone Extra
Benzyl Acetate Ia, ffc.
Benzyl Alcohol, ffc.
Benzyl Benzoate, ffc.
Benzyl Cinnamate
Benzyl Salicylate
Bornyl Acetate
Bromelia
Bromstyrol pure
Cinnamic Alcohol
Cinnamic Aldehyde 100% ffc.
Cinnamyl Acetate
Cinnamyl Butyrate
Cinnamyl Formate
Cinnamyl Iso Butyrate
Cinnamyl Propionate
Citronellol
Cumarin 100%
Cuminic Aldehyde
Diacetyl
DiMethyl Anthranilate
DiMethyl Hydroquinone
DiPhenyl Oxide
Ethyl Benzoate
Ethyl Cinnamate
Ethyl Methyl Phenyl Glycidate
Ethyl Phenyl Acetate
Ethyl Phthalate
Ethyl Vanillin (Vanillose)
Geraniol Extra
Geraniol Pure
Geraniol T
Heptylidine Acetone
Hyacinthin Special
Hydratropic Aldehyde
Hydrocinnamic Alcohol
Hydrocinnamic Aldehyde 100%
Hydroxy Citronellal Special
Indol
Indolene
Ionone Ketone
Ionone Methyl
Ionone Terpenes
IsoBornyl Acetate
IsoButyl Furyl Propionate
Iso Jasmone
IsoButyl Salicylate
Methyl Acetophenone (Melilot)
Methyl Amyl Ketone
Methyl Anthranilate
Methyl Anthranilate of Methyl (DiMethyl Anthranilate)
Methyl Benzoate (Niobe-Oil)
Methyl Cinnamate
Methyl Iso Amyl Ketone
Methyl Nonyl Ketone
Methyl Napthyl Ketone (Orangeol A)
Methyl Phenyl Acetate
Methyl Phenyl Carbinol (Styralyl Alcohol)
Methyl Phenyl Glycidate of Ethyl
Methyl Salicylate (Oil of Wintergreen Art.)
Nerolin Bromelia
Nerolin Yara Yara
Niobe Oil (Methyl Benzoate)
Para Cresyl Acetate
Para Cresyl Caprylate
Para Cresol Ethyl Ether
Para Cresol Methyl Ether
Phenyl Acetaldehyde DiMethyl Acetal
Phenyl Ethel Acetate
Phenyl Ethyl Butyrate
Phenyl Ethyl Iso Butyrate
Phenyl Ethyl Alcohol
Phenyl Ethyl Cinnamate
Phenyl Propyl Alcohol
Phenyl Propyl Aldehyde
Pineapple Base Special
Rhodinol
Styralyl Acetate
Styralyl Alcohol (Methyl Phenyl Carbinol)
Terpineol
Terpineol Alpha Extra
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Tolyl Aldehyde
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AROMATIC CHEMICALS IN MILLED SOAPS—Continued

NAME OF PRODUCT	Discoloration	Change in character of odor	Lasting index wrapped	Lasting index unwrapped	Intensity of odor	Good for white soap	Good for colored soap	OBSERVATIONS
Cinnamyl Acetate	No	gradual fading	30	15	medium	Yes	Yes	Nice character, stronger than cinnamic alcohol.
Citral	Forms yellow spots	gradually turns resin like	12	1	medium	No	?	Value in soap doubtful, except in bouquets with fixative resins.
*Citronellol	No	gradual	50	25	weak	Yes	Yes	Indispensable in rose odors. Odor fades gradually but is perceptible to the end, and is always agreeable.
Citronellal	No	turns to isopulegol	4	1	strong	Yes	Yes	Not lasting enough to be of great interest. Polymerizes rather quickly and turns to isopulegol odor.
Citronellyl Acetate	No	fading	25	10	medium	Yes	Yes	For rose and lily of the valley.
*Coumarine	No	gradual	50	30	lasting sweet	Yes	Yes	Good fixative and sweetener, excellent for all soaps.
Cuminic Aldehyde	No	gradual fading	25	15	strong	Yes	Yes	Good uplifter of odor. Use 1 or 2 per cent of the formulae. Good in carnation.
*Dimethyl Hydroquinon	No	gradual	50	30	medium sweet	Yes	Yes	Good fixative useful in jasmin and other floral odors.
*Diphenyloxide	No	gradual	50	30	sweet	Yes	Yes	Useful in rose odors. Perfectly stable.
Diphenylmethane	No	gradual	50	30	sweet	Yes	Yes	Geranium leaf odor.
Dimethylanthranilate Natural	No	gradual	50	25	strong	Yes	Yes	Useful to replace methylanthranilate in orange blossom odors.
Dimethylanthranilate synthetic	Slightly yellowish spots	gradual	40	20	medium	No	Yes	Safer to use only in colored soaps as it very often contains monomethylanthranilate which discolors.
Ethylbenzoate	No	stable	20	10	strong	Yes	Yes	Good for top note in bouquets.
Ethylcinnamate	No	fairly stable	25	10	medium	Yes	Yes	Good as a fixative for cologne odors.
Ethylvanillin	Turns brown	stable	50	50	sweet	No	Yes	Not good, except in colored soap, because it discolors. Discolors less than vanillin as it is more concentrated in odor value.
*Eucalyptol	No	fairly stable	40	25	medium	Yes	Yes	Blends well with lavender.
Eugenol	Turns brown	Turns disagreeable unstable	25	10	medium	No	No	Should be rejected except for use in colored soaps.
Geraniol	No	stable fading	30	10	weak	Yes	Yes	Fairly stable, but not very intense in odor.
Geranylacetate	No	fading	10	2	medium	Yes	Yes	Not very lasting. Otherwise good, especially if used with soluble resins.
Geranylbutyrate	No	fading	12	2	medium	Yes	Yes	Same as geranyl acetate.
Geranylformate	No	fading	10	2	medium	Yes	Yes	Same as geranyl but very unstable.
Heliotropin	Not always	stable	40	25	sweet	No	Yes	Discolors when not absolutely pure. Discolors also when exposed to the light. Would not recommend for use in white soaps.
Hydratropic Aldehyde	No	Fairly stable	40	10	pungent	No	No	Odor not very agreeable but more stable than phenylacetaldehyde that it can substitute.
Hydroxy citronellal	Turns yellowish	turns bad	1	0	weak	?	?	Not generally recommended in soap as it polymerizes and fades very quickly. Used successfully however in individual cases, in mixtures with stabilizers.
Indol	Turns brown	Fairly stable	50	50	strong	No	Yes	Can only be used in colored soap.
Isoborneol	No	fairly stable	20	10	fresh medium	Yes	Yes	Refreshing pine odor not very lasting.
Iso bornyl acetate	No	fairly stable	30	15	fresh medium	Yes	Yes	
Iso-eugenol	Yes	turns bad	10	5	medium	No	No	Can be stabilized and used in mixture for colored soaps.
Iso-safrol	No	stable	50	25	medium	Yes	Yes	Used only in cheap toilet soaps.
Linalool	No	fairly stable	40	4	sweet	Yes	Yes	Good product, sweet and lasting, especially when associated with styrax or labdanum. S.R.
Linalylacetate	No	fairly stable	40	4	sweet	Yes	Yes	Very good in jasmin and lily of the valley odors.
Menthol	No	fading	15	4	strong	Yes	Yes	Refreshing, blends well with bergamot, lavender, etc. Use sparingly for fresh note, not very lasting.
Methylacetophenone	No	stable	40	6	strong	Yes	Yes	Good in all kinds of soaps, gardenia, new mown hay odors.
Methylanthranilate	Yes	turns bad	—	—	sweet	No	No	Odor fading and turning bad within a week.
Methyl benzoate	No	fairly stable	30	1	strong	Yes	Yes	Odor fading gradually but stable.
Methyl Cinnamate	No	stable	50	10	mild	Yes	Yes	Used as a fixative for certain odors.

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Now manufactured entirely in the United States, under the personal supervision of Dr. Albert Verley, these specialties are available on a production basis. Because of their great power, comparatively small quantities are required for interesting effects—keeping your costs within tolerable limits . . . Here is an opportunity to revise or rejuvenate some of your principal perfume compositions, with materials from a dependable source—located entirely within the United States, but gaining inspiration over the past ten years from a constant exchange of methods and techniques with our European house, and now completely self-contained. Write for working samples and prices.

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and

Dimethyl Benzyl Carbinol Acetate, Butyrate, Propionate

★

Diacetyl

★

Floral Similes

Synthetic Bergamot
Synthetic Lavender
Synthetic Geranium
Synthetic Oak Moss

★

Methyl Ionone Gamma

★ *Albert Verley* aromatics

ALBERT VERLEY, INC., D. A. Bennett, *President*, 1621 CARROLL AVE., CHICAGO, ILL.
114 EAST 25TH STREET, NEW YORK • MEFFORD CHEMICAL CO., LOS ANGELES

AROMATIC CHEMICALS IN MILLED SOAPS—Continued

NAME OF PRODUCT	Discoloration	Change in character of odor	Lasting index wrapped	Lasting index unwrapped	Intensity of odor	Good for white soap	Good for colored soap	OBSERVATIONS
Methyl Naphthyl Ketone (cetone D)	No	stable	50	30	sweet	Yes	Yes	Replaces methylanthranilate advantageously in orange blossom or other odors.
Methylheptenone	No	turns slightly acrid	20	5	sweet	Yes	Yes	Not especially recommended as it turns rather quickly.
Methylheptin carbonate	No	fading	20	5	sweet	Yes	Yes	Good, but not very lasting.
Methyl octin carbonate	No	fading	20	5	sweet	Yes	Yes	Good, but not very lasting.
Methyl para cresol	No	fairly stable	16	2	strong	Yes	Yes	Can be used in small quantities in floral bouquets odors to uplift them, but odor is not very agreeable after standing.
Methylphenyl acetate	No	stable	20	6	strong	Yes	Yes	Can be used to advantage in bouquet odors.
Methyl salicylate	No	stable	50	40	strong	Yes	Yes	Used mostly in medicinal soaps.
Musk Ambrette	No	very stable	50	50	sweet strong	Yes	Yes	Certain makes of musk ambrette discolor. See our test on musk. These musks are the best artificial musks for soap use.
Muskone	No	—	52	52	sweet	Yes	Yes	
Musk Ketone	No	very stable	50	40	sweet medium	Yes	Yes	Not as strong as ambrette but finer in odor.
Musk Xylene	No	stable	50	40	sweet weak	Yes	Yes	Has not very much odor, we prefer ambrette or ketone.
Nerolin Ethyl Beta Naphthol	No	stable	50	40	sweet	No	Yes	Sometimes discolors in soaps but is generally stable.
Nonylacetate	No	fairly stable	25	5	strong	Yes	Yes	Used in small amounts in jasmin type of odors.
Octylacetate	No	fairly stable	25	5	strong	Yes	Yes	Used sparingly in rose tea odors.
Paracresolacetate	No	turns acrid disagreeable	16	1	strong	Yes	Yes	Can be used in small amounts in bouquet odors to uplift them but should be avoided wherever possible as it takes on bad odor after standing.
Paracresol phenylacetate	No	fading	10	2	sweet weak	Yes	Yes	Not very lasting but can be used in small amounts.
Phenylacetaldehyde	No	fading quickly	9	1	strong	—	—	Odor fades quickly. Not recommended.
Phenylacetic acid	No	fading quickly	1	½	sweet	No	No	Odor vanishes quickly, unsuitable for soaps.
Phenylethylacetate	No	no	40	12	sweet	Yes	Yes	Suitable for all kinds of soap, alkali fast.
Phenylethyl alcohol	No	no	50	25	sweet	Yes	Yes	Very good in all soaps.
Phenylpropyl alcohol	No	no	50	5	sweet	Yes	Yes	Same as phenylethyl alcohol.
Phenylpropyl aldehyde	No	fading	10	5	strong	Yes	Yes	Not very lasting, but gums and resins improve lasting qualities.
Rhodinol	No	very stable	30	20	sweet	Yes	Yes	Retains its odor pretty well, especially when mixed with soluble resins.
Safrol	No	very stable	50	50	medium	Yes	Yes	Used only for cheap toilet soaps as odor is ordinary.
Skatol	No	fairly stable	50	50	strong	No	Yes	Used in small amounts in bouquets and synthetic civet.
Styrallylacetate	No	fairly stable	30	2	strong	Yes	Yes	Must be associated with soluble resins to be really lasting.
Styrallyl alcohol	No	stable	30	10	medium	Yes	Yes	Is more stable than styrallylacetate but not as strong inodor.
Terpineol	No	fairly stable	40	30	weak	Yes	Yes	Must be kept in stock in glass otherwise may discolor. Sometimes turns turpentine-like in the low grades, oxidizes slightly in soaps.
Terpenyl acetate	No	turns slightly	50	35	weak	Yes	Yes	Must be kept in glass containers.
Thymol	No	very stable	50	50	strong	Yes	Yes	Used mostly in medicated soaps. Very fast.
Vanillin	Turns dark brown	fairly stable	50	30	sweet	No	Yes	Keeps its odor very well but turns chocolate brown in a very short time.
Vetyverylacetate	No	stable	50	50	medium	Yes	Yes	Excellent product but on account of price must be reserved for expensive soaps.
Vetyverol	No	very stable	50	50	medium	Yes	Yes	Very excellent product.
Yara-Yara nethyl ester	Turns orange	stable	50	50	strong sweet	No	Yes	Very useful in low price colored soaps.

SOLUBLE RESINS IN MILLED SOAPS
(Group 3)

Benzoin	No	perfectly stable	50	30	sweet	No	Yes	Very excellent fixative with a sweet lasting odor. If used in small amount will not color white soaps very much. Is a fat stabilizer.

SOLUBLE RESINS IN MILLED SOAPS—Continued

NAME OF PRODUCT	Discoloration	Change in character of odor	Lasting index wrapped	Lasting index unwrapped	Intensity of odor	Good for white soap	Good for colored soap	OBSERVATIONS
Balsam Peru	No	stable	50	50	sweet	No	Yes	Gives good results in floral bouquets for soap.
Balsam Tolu	No	stable	50	50	sweet	No	Yes	Gives very good results in all kinds of bouquet odors.
Castoreum	Slight yellowish	fading slowly	50	15	animal	?	Yes	Can be used in small amounts in white soaps. Certain qualities reinforced with indol or skatol discolor. Very valuable in blends.
Ciste green labdanum	No	very stable	50	50	fairly strong	Yes	Yes	To be used in small amount only in white soap as it has a natural green color, but will not discolor. Very excellent fixative superior to the Spanish product.
Civet	No if pure	stable fading	30	10	sweet animal	?	Yes	Valuable only in blends. This product, especially soap quality very much adulterated giving very irregular results. With pure civet from direct import no discoloration was noticed.
Galbanum	No	stable	50	10	strong leafy	Yes	Yes	Gives a green leafy odor in bouquet odors.
Labdanum Spanish	No	stable	50	50	fairly strong	No	Yes	Gives nice amber tone to bouquet odors especially of the oriental type.
Myrrh	darkens	stable	50	50	strong	No	Yes	Give nice oriental odors when blended with olibanum and ciste.
Olibanum	No	stable	50	50	aromatic sweet	?	Yes	Sometimes gives slight discoloration but can be used in small amounts in white soap. Very agreeable aromatic odor.
Orris	No	stable	50	50	medium	Yes	Yes	The resinoid is dark but will not discolor. Very good in violet and oriental bouquets.
Oak Moss	No except for natural color	fading	40	10	medium	?	Yes sometimes	Very good in colored soaps, even in white soap. Turns grayish after a time. Could probably be used in small amount in white soaps.
Oppoponax	darkens	stable	50	8	medium	No	Yes	Darkens slightly in aging, otherwise good.
Styrax North American	No	very stable	50	50	sweet aromatic	Yes	Yes	Sweet aromatic odor very lasting. Good fixative for floral odors.
Styrax Honduras	No	very stable	50	50	strong aromatic	Yes	Yes	Has a much higher note than the North American styrax and a great deal more odor value.
Styrax Asiatic	No	very stable	50	50	sweet	Yes	Yes	Has much less value than the North American and Honduras styrax but on account of lower price is still very much used.

ESSENCES FROM RESINS IN MILLED SOAPS
(Group 4)

*Benzoin	None	stable	50	30	sweet	Yes	Yes	Nice sweet odor, quite lasting and much stronger than the soluble resin.
*Balsam Peru	None	stable	50	50	sweet	Yes	Yes	Useful in many bouquets, particularly lily of the valley type.
*Balsam Tolu	None	stable	50	50	sweet	Yes	Yes	Sweet balsamic odor. Useful as a flora or oriental bouquet base.
Ciste green Labdanum	None	very stable	50	50	medium sweet	Yes	Yes	Fine amber note, blending especially well with vetyvert, patchouly and other balsams.
Galbanum	None	stable	50	20	strong leafy	Yes	Yes	Strong leafy character to use sparingly.
Labdanum Spanish	None	stable	50	50	sweet	Yes	Yes	Not as stable and fine as ciste but excellent fixative.
Myrrh	Slight	stable	50	50	aromatic	?	Yes	Very sweet, useful in oriental type of bouquets.
Olibanum	None	stable	50	50	aromatic sweet	Yes	Yes	Very aromatic useful in all types of bouquets.
Orris	None	stable	50	30	woody medium	Yes	Yes	For violet and violet types of bouquet, also oriental.
Styrax	None	stable	50	50	sweet	Yes	Yes	Forms an excellent aromatic base with all kinds of bouquet odors.

LIST OF PERFUMING MATERIALS
Best Suited for Soap Perfumes Having a Lasting Index of at Least Thirty in Wrapped Soap (Group 5)

FOR WHITE SOAPS

Essential Oils

Oil of Angelica Seeds
Oil of Anise
Oil of Basil
Oil of Bergamot
Oil of Birch Sweet
Oil of Calamus
Oil of Cananga
Oil of Caraway
Oil of Cardamom
Oil of Cedarwood
Oil of Citronella Java
Oil of Coriander (very good)
Oil of Cubebs
Oil of Eucalyptus
Oil of Galbanum
Oil of Geraniums (Bourbon, African, Palma Rosa)
Oil of Ginger Grass
Oil of Guiac Wood
Oil of Lavender
Oil of Linaloe
Oil of Lovage
Oil of Mace
Oil of Myrtle
Oil of Neroly
Oil of Nutmeg
Oil of Origanum
Oil of Patchouly
Oil of Pepper (black)
Oil of Peppermint
Oil of Petitgrain
Oil of Rosemary French and Spanish
Oil of Sandalwood (East India and Australia)
Oil of Tansy
Oil of Spearmint
Oil of Thyme
Oil of Verbena (true)
Oil of Vetyvert (Bourbon and East India)
Oil of Wormwood
Oil of Ylang Ylang

Soluble Resins

Ciste (French Labdanum)
Galbanum
Orris
Styrax North American
Styrax Honduras
Styrax Asiatic
Civet (if pure)
All distilled essences from these resins with the exception of Myrrh.

AROMATIC CHEMICALS

Acetophenone
Amylcinnamic Aldehyde
Anisic Alcohol
Benzophenone
Benzylacetate
Benzylcinnamate
Benzylpropionate
Borneol
Bornylacetate
Benzyl benzoate
Cinnamic alcohol
Cinnamyl acetate
Citronellol
Coumarin
Dimethylhydroquinone
Diphenyloxide
Diphenylmethane
Dimethylanthranilate natural
Eucalyptol
Geraniol
Iso-safrol
Linalool
Linalylacetate
Methylacetophenone
Methylbenzoate
Methylcinnamate
Methylnaphtyl Ketone
Methylsalicylate
Musk Ambrette
Musk Ketone
Musk Xylol (See test for discoloration.)
Phenylethylic alcohol
Phenylpropyl alcohol
Rhodinol
Safrol
Styrallylacetate
Styrallylalcohol
Terpineol
Terpenylacetate
Thymol
Vetyverylacetate
Vetyverol

FOR COLORED SOAPS ONLY

Essential Oils

Oil of Bay
Oil of Cade
Oil of Myrrh
Oil of Pimento

Soluble Resins

Benzoin
Balsam Peru
Balsam Tolu
Castoreum
Labdanum Spanish
Myrrh
Olibanum
Oak Moss
Oppoponax

Aromatic Chemicals

Bromstyrol
Cinnamic Aldehyde
Dimethylanthranilate synthetic
Ethylvanillin
Heliotropine
Indol
Nerolin (Ethyl Beta-Naphtol)
Skatol
Vanillin
Yara-Yara (Methyl Beta Naphtol)

Advertising Check List

A Review of Advertising Claims for Soaps, Insecticides, Disinfectants, Cleaners, Polishes etc., That Have Been Outlawed by the Federal Trade Commission

Compiled by NATHAN R. ABELSON

SINCE the inception of the Wheeler-Lea Amendments in May, 1938, the Federal Trade Commission has been given more effective control and greater jurisdiction over all advertising. With each passing month, it becomes increasingly difficult for advertisers and advertising agencies to keep abreast of the latest developments in this vital field.

Although the soap and sanitary chemicals industry has not been singled out for criticism more than any other group—enough stipulations and cease and desist orders have been issued to enable one to draw definite conclusions as to the Commission's attitude on certain advertising claims.

As a guide to soap and chemical organizations, a check-list developed from all cases dealing with soap and chemical products, has been put together listing specific claims to which the FTC has objected in the past. Such a check-list will prove a valuable aid to all advertisers who, in the preparation of their copy, are making an honest effort to steer clear of any untoward contact with the Federal Trade Commission.

Soaps—Cosmetics

To cease representing that the product

... keeps the complexion "flawless."
... is "made especially" to guard against cosmetic skin.
... can be relied upon to keep the skin "clear" unless limited to such conditions as are due to, or aggravated by, dirt, cosmetic residue, epithelial debris or foreign materials.

(Lever Bros., "Lifebuoy" and "Lux" soap, Stip. No. 02114)

... is a remedy for dryness, roughness of the skin, eczema and acne.
ness of the skin, eczema and acne.
figurements.
... rejuvenates the texture of the skin.
... is a skin normalizer or that it restores distinguishable measure of baby skin blush and freshness to the skin by restoring skin lipids.
... contains "Vitamin F."

To cease representing that

... because of modern living habits or conditions including washing or bathing of the face, indispensable fatty acids are removed from the skin.
... substantial quantities of Vitamin E and the so-called "Vitamin F" can be introduced into and absorbed by the system by means of local application.

(Imogene Sheperd, Ltd., Cease and Desist Order No. 3625)

... any specified number of disease germs are spread by hands "alone."
... the "special ingredient" of the soap makes the lather more penetrating.

(Lever Bros., "Lifebuoy" and "Lux" soaps, Stip. No. 02114)

... beauty experts endorse the use of the product.
... doctors advise or prescribe the use of the product.

(Manhattan Soap Co., Inc., "Sweetheart Toilet Soap," Stip. No. 02516)

... the use of soap and water is inefficient or is detrimental to the skin, that harmful alkali is present in the finest soaps, or that soap and water are too drying for use on the skin.

(Marie Earle, Inc., Stip. No. 02340)

To cease representing that the product

... "reaches down to the pores."
... "Can't irritate the most sensitive skin" or using any other claim that may imply the soap is non-allergic.

(Procter & Gamble, "Camay" soap, Stip . No. 02375)

... will cause the skin to become healthy or keep the skin healthy.
... will cause one to become or stay young.

(Manhattan Soap Co., Stip. No. 02516)

Soaps and Flakes—Laundering

To cease representing that the product

... puts new life into fabrics.
... improves the original quality of the fabrics.

(Lever Bros., "Lux" flakes, Stip. No. 02114)

... contains any cleansing agent superior to or different from pure soap.
... enables the use of less soap except to the extent that the product itself supplies the required pure soap content of a laundry solution.
... eliminates rubbing or scrubbing.

(General Foods Corp., "La France," Stip. No. 02376)

... contains a unique ingredient which makes it the only soap

which will remove stubborn "deep down dirt from clothes."

... never fades colors, unless directly limited in context to reference to colors which are washable.

... cuts washing time, loosens dirt faster, washes clothes whiter, or any other comparison, unless the basis of the comparison is stated in direct connection.

(Procter & Gamble, "White Naphtha Soap," Stip. No. 02434)

... is safer for the hands than all other laundry soaps.

... is as safe for the hands as toilet soap.

... is the only soap producing "shampoo" action or employing a "suction" principle or that either of such actions is new.

... is made especially for any particular locality.

(Procter & Gamble, "Chipso," Stip. No. 02423)

... prevents red or rough hands.

(Lever Bros., "Rinso," Stip. No. 02468)

... whites clothes perfectly or naturally.

... makes clothes whiter with less washing or rinsing.

... is "the" most powerful water-softener ever discovered by chemists.

... is the most effective or economical cleanser for all house cleaning, laundry or bath.

... sanitizes the atmosphere for healthful cleaning.

... does not crumble.

(The Absorene Mfg. Co., Cease and Desist Order No. 3390)

To cease representing that

... the makers of 33 washing machines have recommended the effectiveness of the product "above all others."

(Lever Bros., Stip. No. 02468)

Medicinal Soaps and Ointments

To cease representing that the product

... helps promote lustrous hair growth quickly.

... aids in normalizing oily skin and in refining skin texture.

... aids in imparting new firmness to the skin.

... removes or aids in clearing blemishes unless limited to blemishes that are externally caused.

... cleanses the pores deeply or thoroughly or eliminates coarse pores.

("Cuticura" soap and ointment, Stip. No. 0892)

... is beneficial in the treatment of "the itch" and of itching from all causes; of skin irritations or scalp irritations unless limited to palliative relief; and for sunburn or any other similar condition.

... will completely remove or eliminate blackheads.

(E. T. Browne Drug Co., Inc., Stip. No. 02411)

... will "eradicate," "prevent," "cure," or "rid" the scalp of dandruff or in any way implying that it will permanently eliminate dandruff.

... will "arrest" falling of the hair.

... assures healthful scalp conditions, keeps the hair healthy, or constitutes a complete scalp treatment.

... disinfects the scalp.

(Packers' Tar Soap, Inc., "Scalptone," Stip. No. 02507)

... is a complete remedy for burns, cuts, piles, ivy and oak poisoning, insect and frost bites, chilblains, acne, old sores, or eruptions of the skin.

... is of any substantial value in the treatment of the bite of a black widow spider, athlete's foot, carbuncles, soft corns, ringworm, or abscess.

... will remove splinters.

... prevents scars following carbuncles, burns or any other condition.

(The Gordshell Chem. Co., Stip. No. 02365)

... is a cure or remedy for dhobie or barber's itch, jock strap itch, prickly heat, dermatitis herpetiformis, pimples, charing, shingles, ringworm or epidermophytosis, impetigl, pruritus, aching feet, or furnuculosis of the ear canal.

... is a bactericide or that it will prevent reinfection.

... stops perspiration or prevents body odors.

(Patch Premek Corp., Cease and Desist Order No. 3469)

To cease representing that

... wetting of the hair is a contributing cause or is responsible for 6 out of 10 cases of baldness, or that experts are of the opinion that baldness is due to wetting of the hair.

(Packers' Tar Soap, Inc., Stip. No. 02507)

To cease representing that the product

... has a wool fat base.

... contains double strength or extra strength medication.

... penetrates the skin.

To cease representing that

... cold ointments made with a mineral jelly base stays on the surface of the skin because of the presence of the mineral jelly.

(Brown Drug Co., "Spencer's Cold Ointment," Stip. No. 02635)

Hair Rinse

To cease representing that the product

... will make dyed hair natural looking.

("Drene," Stip. No. 02247)

... and only this product can enable one to restore and retain the beauty of blond hair.

... will keep the hair healthy.

... can be used by brunettes without lightening the color of the hair.

... "restores" any natural characteristic or quality to the hair or will enable every user to be a "natural" blonde.

("Marchand's Golden Hair Wash," Stip. No. 02334)

... adds a natural sheen to the hair.

(The Nestle-LeMur Co., Stip. No. 02566)

... is not a dye or does not alter the natural appearance or natural color of the hair.

... "banishes" dull hair.
... is the only line of hair rinse which is complete or is suitable for all shades of hair.
... is the original or the largest selling hair rinse.
... is one shade of rinse that adapts itself exactly to all shades of hair.
... assures accuracy in attaining the desired tint.
... is a "perfect" rinse.

To cease representing that
... all hair requires the application of a tint in addition to a shampoo.

(Golden Glint Co., Inc., "Golden Glint," Stip. No. 02230)

... "60 per cent of all women were born blonde."

("Marchand's Golden Hair Wash," Stip. No. 02334)

To cease representing that the product
... is a vegetable product.
... accomplishes the same results as a lemon rinse.

(Marcus-Lesoine, Inc., Stip. No. 02596)

Cleaner and Water Softener

To cease representing that the product
... contains no caustic soda or lye.
... is a most excellent antiseptic or germ destroyer.
... in a tub of wash, will eliminate the necessity of rubbing clothes.
... has any particular value as a shampoo other than to soften hard water.

(Stipulations were signed by six companies on these claims)

Scouring Powder

To cease representing that the product
... will keep an ice-box or refrigerator germ-free.
... will absorb all odors or keep a refrigerator odorless.
... will not harm the "most delicate" surfaces.
... will restore the original brightness and lustre to painted surfaces.
... will be effective as a cleaning agent without rubbing or scrubbing.

To cease representing that
... fruits and vegetables may stay crisp and fresh much longer when the product is used in the refrigerator.
... surfaces cleaned with product stay clean longer.

(Fitzpatrick Bros., Inc., "Kitchen Klenzer," Stip. No. 02280)

Cleaning Fluid

To cease represnting that the product
... will not burn, or is non-inflammable.
... cannot explode.
... leaves no rings, wave marks or spots.
... will remove all stains regardless of their cause.
... is used in every home or is the only cleaner of its type obtainable at a moderate cost.

(Midway Chem. Co., "De Luxe Cleaning Fluid," Stip. No. 0231)

... has sterilizing or germ destroying or moth-proofing qualities.

(Nu-Life Cleaner Mfg. Co., Stip. No. 2607)

To cease representing that
... any mixture of the product and water is the equivalent in chlorine concentration to Dakin's Solution.

(The John Puhl Prod. Co., Stip. No. 02435)

To cease
... use of the word "Sanitizes" implying that the product is effective as a germicide or an antiseptic.

(Vapoo Products Co., Inc., "Vapoo", Stip. No. 2572)

Lye

To cease representing that the product
... is "unequalled" as a drain pipe opener, for cleaning garbage pails, soap-making, disinfecting, or "is the highest test lye possible for trained chemists to produce."
... is "kind to your hands" and/or "safe for the most delicate fabrics."
... can "always" be relied upon for satisfactory results.
... kills germs.
... makes milking machines germ-free, or sterilizes such machine.
... kills bacteria, except the vegetative form.
... helps prevent bovine abortion, unless it is explained that this statement is not true under all conditions.
... prevents roundworm and disease.
... is more than six times as strong as carbolic acid.
... "destroys" bad odors, unless it is explained that it must reach the cause of such odors.
... "keeps down" flies in outdoor toilets or similar places.

(Penna. Salt Mfg. Co. "Lewis Lye," Stip. No. 02358)

Deodorant and Germicide

To cease representing that the product
... will banish odors.
... puts an end to unsanitary odors.
... purifies or makes safe the "hidden trap."
... kills germs.

(The Hygienic Products Co., "Sani-Flush," Stip. No. 02196)

To cease representing that
... the use of the product is the only method by which a toilet bowl or trap can be cleaned.
... toilet odors are a "danger sign."
... the toilet bowl or trap cannot be cleaned by rubbing or scrubbing.

(The Hygenic Products Co., "Sani-Flush," Stip. No. 02196)

Insecticide

To cease representing that the product
... is 30 times as powerful as arsenate of lead for stomach poison for insects or that it is 15 times as powerful as nicotine for sucking insects.
... kills, controls or combats bugs, insects and worms.
... is recognized by the U. S. Department of Argiculture as the most

powerful insecticide yet discovered or that it is a "new discovery" or "brand new."

... will stop, prevent, or cure all types of fungus growth, mildew, blight, leaf spot or diseases of plants.

... is effective for a long period of time or any period of time.

... is effective against the following insects: blister beetle, plant lice, cabbage bug, tomato horn worm, sweet potato beetle, leaf hoppers, web worm, diamond black moths, melon lice, squash vine borer, pinch beetle, 8-spotted forester, corn earworm, forest worms, climbing cut worms, army worms, grass hoppers, squash bugs, worms which infest grape vines.

(Henry Field Seed Co., "Bug Dust," Stip. No. 02200)

... is a double strength insecticide.

... will prevent or eliminate infestation in foodstuffs and in places where foodstuffs are kept and stored.

... will keep bugs and insects away from foodstuffs and places where foodstuffs are kept and stored.

(Midland Chem. Lab., Inc., "Mill-O-Cide," Stip. No. 02455)

... kills flies, mosquitoes, fleas and moths "instantly."

... contains no kerosene, unless or until it is manufactured without kerosene as an ingredient.

... is the only nationally known spray at popular prices.

... is one-half the price of other sprays.

... kills any but sweet-eating ants.

... is effective against cut worms.

... will not taint milk.

(Midway Chemical Co., Stip. No. 02301)

... kills bed bugs or bed bug eggs instantly.

... is odorless and will rid or eliminate roaches from all buildings overnight.

(Wilson Bros. Paint and Hardware Co., Stip. No. 02574)

... assures healthy green foliage or luxuriant blooms or that any results are assured through its use.

(Rose Mfg. Co., Stip. No. 02586)

... is an "all-purpose" insecticide.

... neither stunts, injures, nor retards the growth of development of plant life or has any injurious effect on it.

To cease representing that

... the product or other insecticide containing nicotine or other toxic ingredient in sufficient quantity to cause injury when taken into the human or animal system is non-poisonous to humans or domestic animals.

(Imperial Chem. Co., "Bug-Dust-O-Cide," Stip. No. 2940)

... roaches are carriers of cancer and re-carriers of disease germs or disease.

... one application of the product will keep any building clean of roaches, water bugs, silver bugs or ants, for one year.

(Wilson Bros. Paint and Hardware Co., Stip. No. 02574)

Disinfectant and Bactericide

To cease representing that the product

... is an effective antiseptic for wounds when used by washing the abrasion with a solution of 1½ tablespoonfuls of the product to each quart of water.

... may be used as a substitute for phenol when removing hard corns, or that it has all the advantages of phenol.

... constitutes an adequate treatment for ulcers, fistulas and exuberant tissue.

... acts as a sterilization agent.

... is a disinfectant or germicide in any solutions weaker than competent scientific tests show are necessary to produce the results claimed.

... is a germicide capable of killing the pus-forming organism *Staphylococcus aureus* in concentrations and periods of time less than competent scientific tests show are necessary to produce the results.

... is non-toxic.

(Hexol, Inc., "Hexol," Stip. No. 02404)

... kills the germs that cause diseases "instantly," in hot or cold or water solutions.

... sterilizes, purifies and relieves.

... harms nothing but the germs.

... is a reliable germicide for all sanitary purposes.

(General Laboratories, Penna. Salt Mfg. Co., Stip. No. 42387)

... when diluted, one part to 150 parts of water, will have the germicidal strength of a 5 per cent solution of carbolic acid.

... will keep the home "safely" clean.

... will help fight epidemics.

... will "guard" children's health or "protect" the family's health.

... will repel insects.

(West Disinfecting Co., "CN Disinfectant," Stip. No. 02253)

To cease representing that

... a 1:25 dilution of the product will kill strains of *Staphylococcus Aureus* or *Streptococcus Haemolyticus* after one minute exposure.

... the action of the product is stronger than carbolic acid.

... a 3 per cent or 6 per cent solution of the product sterilizes or kills *anthrax* or *Subtilis* spores in thirty minutes.

... a 1:500 dilution of the product will kill *Typhoid Bacilli* after one minute exposure.

(Hexol, Inc., "Hexol," Stip. No. 02404)

To cease representing that the product

... removes all stains or discolorations or that it removes any stains or discolorations other than those stains or discolorations which are capable of oxidation to a colorless end-product.

(Linco Products Corp., "Linco", Stip. No. 02679)

Fumigant

To cease representing that the product

...is a safer fumigant, unless conspicuous notice is given in direct connection with every claim for safety, that all fumigants are a deadly poison, but by the product's capacity to produce tears warns persons to get away from it.

...is the most powerful fumigant yet developed.

...penetrates every berry in every bushel of wheat.

To cease representing that

...one fumigation a year with the product will provide protection from moths unless it is clearly stated in direct connection that usual general spot treatment is also needed.

...the use of the product to fumigate will result in egg-free flour made by such machinery.

(Innis, Speiden & Co., "Lavacide," Stip. No. 02503)

Polishing Wax

To cease representing that the product

..."stops" spotting.

...restores the original finish.

...never clouds the lustre of any finish.

To cease representing that

...the melting point of the product or of any competing product is any degree of temperature not in accordance with the facts.

(L. W. Middleton, "Middleton's Weather Wax," Stip. No. 02237)

Shoe Polishes & Wax

To cease representing that the polish

...is waterproof under all conditions of use.

...gives brighter and longer lasting shines than any other brand or is in any designated respect superior to all other brands unless such statements are substantiated by competent comparative tests.

(Griffin Mfg. Co., Inc., Stip. No. 02388)

...eliminates scratched and marred areas from shoe leather, feeds, or nourishes leather.

...causes shoes to retain the appearance they had when new or to take on the appearance of new shoes after being repaired.

...has any control over the number of times a shoe may be repaired or half-soled.

...causes shoes to wear better or last longer.

...will have any effect on the outer sole, insole, box-toe, lining, welting, and other parts of shoe, excluding the upper shoe leather, by making unqualified statements relative to it upon "shoes."

To cease representing that the white shoe dress

...will not rub off shoes after application.

(Barton Mfg. Co., Inc., Stip. No. 02484)

...removes all spots, grease and grass stains.

...will remove any spots unless, where use of a special cleaning fluid is first necessary, such a fact is directly stated.

...is the only white shoe cleaner that is good for all white shoes.

(Griffin Mfg. Co., Inc., Stip. No. 02388)

Termite Poisons

To cease representing that the product or method

...exterminates termites in the ground as well as those in the building.

...is "not a temporary control method but complete extermination" or "has lasting results."

(Cre-O-Tex Chem. Prod. Co., Stip. No. 2533)

...embalms or preserves the wood and prevents decay.

...thoroughly penetrates the wood and increases the strength of the wood.

To cease representing that

...termites or other wood boring insects cause serious damage within four to six months or within any period of time less than that in which such damage ordinarily will occur.

...termites will practically ruin a structure before their presence would be discovered.

...termites are in all wood.

...use of the word "Permanize" implying that the product remains permanently in or on the wood and will not dry out or lose its effectiveness.

(Atlas Wood Preservative Co., Inc., Stip. No. 2747)

...the chemicals used in the product are given the highest rating in the International Termite Exposure Tests of many years duration.

...the oils in the product are of great penetrating power which carry the poisonous chemicals deep into the wood or that "deep" penetration is assured.

(Cre-O-Tex Chem. Prod. Co., Stip. No. 2533)

...all new lumber is infested with termites.

...98 per cent of buildings have termites in them.

...a survey allegedly made by the company, of HOLC properties was in fact a "cross-section" inspection of all such properties.

(Termiteol Co., Stip. No. 2527)

Rat Poisons

To cease representing that the product

...is non-poisonous.

...is harmless under all circumstances to pets, stock, poultry, other animals and human beings.

...is 100 per cent effective in the destruction of rodents.

To cease representing that

...the active ingredient thereof, red squill, is a new or original ingredient for rat poisons.

...all rodents who eat the product will go outside of the building to die.

(The Ohio Prod. Co., "Quick-Death," Stip. No. 02412)

Furniture and Auto Polishes*

THE most popular furniture polishes today contain water and oil in the form of emulsions. Water helps to remove soil and hence gives the polish a cleaning action and also serves as a diluent for the oil. The oil remains on the furniture after it is polished, giving the desired high reflectance to the surface. It should be a very thin film so that the surface will not be greasy and pick up dust readily. For a commercial product, it is most desirable to have a stable emulsion in which the oil is dispersed throughout the water phase. This gives the product the pleasing appearance of a creamy liquid and also assures a definite proportion of mineral oil to water.

The emulsion should be only just stabilized as in use it must break down to permit the oil to wet the surface preferentially. Otherwise the varnished wood would merely be wet with water which is the external phase. The polish is wiped on with one cloth and then wiped off with another.

Various soaps are used as emulsifying agents such as triethanolamine soap, soaps made with morpholine and other amines, and soaps made with various fatty acids. A neutral potash soap is preferable to the ordinary soda-tallow soap. A few sulfonated oils serve as emulsifying agents, the most suitable being those which are highly sulfonated and which are neutral. These have to be used in quite high proportions to maintain stable emulsions. For this particular purpose they are frequently neutralized with ammonia. A number of emulsifying agents are used which appear on the market under trade names, some of which consist essentially of glycol oleate, glycol stearate or a similar compound. Water-soluble gums such as gum tragacanth are also used, or in some cases a mixture of gum with a small amount of other emulsifying agent.

When soap is used as the emulsifying agent the minimum amount should be present, as in the following:

	(Parts by weight)
Mineral oil	25
Naphtha	12
Stearic acid	4
Triethanolamine	2
Water	57

Water is the cleaning agent, mineral oil the polishing agent, naphtha a diluent for the oil, and soap the emulsifying agent. The best results are usually obtained by making the soap in the product with the use of fatty acids rather than by adding soap as such. The stearic acid is melted, the naphtha added to the mineral oil and this stirred into the warm stearic acid. The triethanolamine is warmed with the water in a separate kettle to about 60°C. (140°F.) when it is gradually added with stirring to the oil mixture.

The equipment required is quite simple. Jacketed kettles that can be heated and cooled with running water, and fitted with a mechanical stirrer, are all that is required.

An even simpler formula is:

	(Parts by weight)
Mineral oil	50
Ammonium oleate soap	3
Water	47

Again the soap is made in the product by mixing oleic acid with the mineral oil and adding the ammonia in aqueous solution.

While many of these products retain their natural light color, in some cases dyes are added. Frequently inexpensive perfume compounds are also added, pine needle being popular. Oil of citronella, oil of cloves, oil of sassafras and similar oils are also suitable. Nitrobenzene or oil of mirbane has been used but is now prohibited in some places because of the toxicity of its vapors. Benzaldehyde has been used but is unstable.

Another commercial product contains the following:

	Per Cent
Light mineral oil, (36-7° Be.)	20
Xylene	9
Light blown castor oil	10
Potash soap	1
Water	60

Xylene serves as a diluent for the mineral oil. Blown castor oil, quite different from ordinary castor oil, does not mix with mineral oil, although heavy blown castor oil does. The emulsion therefore consists of two immiscible oils and water.

A much more complicated product contains the following:

	Per Cent
Mineral oil, (sp. gr. 0.8769 60°F.)	11
Blown castor oil	1
Glycerine	5
Alcohol	5
Triethanolamine oleate	1
Gum tragacanth	0.5
Diatomaceous earth	12
Water	64.5

Glycerin and alcohol both serve as wetting agents. The emulsifying agent here is a combination of soap and water-soluble gum. Diatomaceous earth is a very soft abrasive often used in automobile polish but having no real justification in furniture polish. Soil on furniture except for serious stains which furniture polish will not help, is removed simply by wiping off. While diatomaceous earth is so soft that it usually does not scratch, it is apt to form deposits in the carving of furniture from which it is removed with difficulty. Since it serves no useful purpose there is no reason to put it into a furniture polish.

With sulfonated oil as emulsifying agent the proportion of mineral

*Based on articles by Dr. C. A. Tyler in the April and June, 1940 issues of *Soap and Sanitary Chemicals*.

oil can be varied considerably, as in these two successful commercial products: (By volume.)

	Per Cent A	Per Cent B
Mineral oil	48	38
Sulfonated castor oil	14	12
Water	38	50

These products have the appearance of oily liquids rather than of the usual emulsions. This type polish is very popular but is strictly a furniture polish and should be labeled as such. It is not efficient as an automobile polish.

When a gum or mixture of gums is used as emulsifying agent only a small proportion is needed:

	Per Cent
Mixture of kerosene and light mineral oil	10
Glycerine	4
Mixture of gum arabic and gum tragacanth	2
Water	84

Here the proportion of water is higher than in most oil-in-water emulsions.

Perhaps the question might occur to the manufacturer as to whether a *water-in-oil* emulsion could be used. Theoretically it should be the best answer, but practically the few products which have attempted such formulation have been rather unsatisfactory because of excess greasiness.

THE oil-emulsion polishes represent those having the best sales acceptance at the present time, because of satisfactory appearance since they do not separate into two layers, they are easy to apply, and are quickly rubbed up. An older type of product is represented by the following formula developed by the Navy Department's Bureau of Construction and Repair:

	(Parts by weight)
Vinegar (acetic acid, dilute)	125
Petroleum spirits	226
Turpentine	135
Alcohol	22
Boiled linseed oil	100
Raw linseed oil	121

Vinegar is an acid cleaning agent since it contains 4 per cent of acetic acid. Acid agents are incompatible with many emulsifying agents used and are not present in emulsion products. The combination of raw and boiled linseed oil with turpentine and mineral oil is practically an attempt to apply a fresh film of varnish, as the linseed oil is supposed to oxidize and form a very light protective coating. Such a product is not a real polish, but a cross between a varnish and a polish, as is any polish containing a drying oil.

One other formula representative of the older type of product is the following:

	Per Cent
Light mineral oil	58
Antimony trichloride	2
Glycerine	7
Water	33

This is an oil-water mixture which is shaken before use to form an exceedingly temporary emulsion. Antimony trichloride is an acid cleaning agent since it hydrolyzes in solution to give hydrochloric acid. It was present in many patented polishes ten years ago, but is now in the discard along with vinegar.

A recently patented furniture polish (U. S. Patent No. 2,141,729), utilizes the sodium salt of a fatty alcohol sulfate as emulsifying agent in combination with a water-soluble gum:

	Per Cent
Oil	17
Glycerine	5.65
Diatomaceous earth	12.25
Amyl acetate	0.25
Formaldehyde	1
Gum tragacanth	0.2
Sodium alkyl sulfate	0.5
Water	63.15

Amyl acetate is present as an odorant, formaldehyde as a preservative, glycerine as wetting agent. The abrasive is probably included with the idea of broadening the use of the product.

Other types of polishes include (1) oil polishes, (2) wax emulsions and (3) liquid and paste waxes. A single oil with an added odorant may be used, or blended oils, or sometimes oils combined with solvents. So-called lemon oil is used by many a housewife as furniture polish. One such commercial product is a plain good-quality mineral oil having a specific gravity of 0.842 at 60°F.

A product which combines oil and solvent contains:

	Per Cent
Light spindle oil	60
Mixed fatty acids	3
Benzol	15
Methanol	20
Pine oil	2

The spindle oil used is a light-bodied lubricating oil having a viscosity less than 100 Saybolt at 100°F. The fatty acids are a refined grade of red oil consisting largely of oleic acid with a little palmitic and stearic acids. In this combination, the fatty acids are intended to give improved wetting power. The pine oil is an odorant; benzol and methanol serve as diluents. A film containing spindle oil and fatty acids remains on the furniture. The chief difficulty with this kind of product is that it requires an enormous amount of rubbing to spread it properly.

Wax emulsions are oil-in-water emulsions containing wax and often containing a volatile oil to aid in holding the wax in solution or suspension. Inclusion of wax thickens up the emulsion. Soft waxes such as beeswax have been used, but a hard wax such as carnauba is preferable. The wax, when rubbed up, gives a much more permanent gloss than oil alone. A wax polish requires more rubbing than an oil emulsion in order to get the film evenly distributed and not too thick. A wax-kerosene-water mixture is made as follows:

	(Parts by weight)
Carnauba wax	100
Kerosene	75
Oleic acid	9
Stearic acid	9
Triethanolamine	8
Water	800

The carnauba wax and stearic acid are melted together, then the oleic acid and kerosene added. About 240 parts of water are warmed to 175°F., the triethanolamine stirred in, and the aqueous solution added gradually with stirring, to the warm oil mixture. Stirring is continued until a smooth emulsion is formed when the rest of the water, also warmed, is added. Stirring is continued while the mixture cools down. The triethanolamine soap makes a very efficient emulsify-

ing agent. This is an expensive product since it contains roughly 10 per cent of carnauba wax, preferably No. 1 Yellow. The formula may be varied by combining one or more other waxes with carnauba, thus reducing the cost. Most products contain a much lower proportion of carnauba wax.

A commercial product very low in waxes contains:

	Per Cent
Light mineral oil	56
Mixed waxes	3
Potassium stearate soap	1
Water	40

The wax mixture contains paraffin and carnauba wax, a combination frequently found in polishes. A good wax emulsion is no doubt a very fine polish when it contains enough wax to give a lasting luster but not enough to make application difficult.

Liquid and paste wax polishes differ from emulsions in that the former contain no water. They are essentially the same whether a floor wax, or furniture polish. The liquids contain enough organic solvent to make them fluid. The liquid usually contains 5-8 per cent of wax in a petroleum thinner. The wax is frequently a 1:1 mixture of paraffin and carnauba wax. The solids settle to the bottom of the container since they do not dissolve and there is nothing to keep them in suspension. This sludge of wax has to be mixed in by shaking when the product is used. With this a wax film of substantial thickness is obtained which should be hard and non-sticky. In general the finest quality of furniture is apt to be kept up with liquid or paste wax.

A commercial paste wax typical of these products contains:

	Per Cent
Petroleum naphtha	74
Mixed waxes	26

The waxes consist of approximately 25 per cent carnauba wax and 75 per cent of paraffin. Preparation is extremely simple, the waxes being melted together and the naphtha stirred in warm. When homogeneous, the mass is cooled quickly with stirring. As it cools the waxes crystallize out from the warm solution. The texture of the wax depends on the manner of cooling; the quicker the cooling such as with a cold-water jacket, the finer the grain of the crystalline wax. The mixture is run into containers just before it is ready to "set." Admixture of a soft wax such as paraffin with the hard carnauba wax gives better spreading power than when carnauba is used alone.

Patents sometimes list a mixture of four or more waxes in one polish but these need not be taken too seriously. A complicated formula is not necessarily any better than a simple one, provided the underlying principles are observed. Many advantages remain on the side of simplicity.

To polish a car, two operations are necessary. One is to remove the film of grease and dirt on the surface and any traces of "dead" lacquer which may be present. The other is to polish or brighten the surface. Much of the polishing of automobile bodies is currently done with combination cleaner-polishes designed to accomplish both of the results mentioned.

The cleaner-polishes consist essentially of mineral oil, a soft abrasive, an emulsifying agent, often a wetting agent, and water, the latter being the vehicle. The wetting agent helps penetrate the soil, the oil dissolves grease in the film, and the abrasive loosens and removes the soil by friction. The oil preferentially wets the lacquered surface, leaving just enough of an oil film on rubbing to give the desired polished effect. The popularity of these cleaner-polishes is explained by the fact that they actually work and that they can be applied fairly quickly without too great an expenditure of effort. A defect is that the resulting polish does not last long, so must be renewed fairly frequently.

The user of a polish expects it to meet a number of requirements: (1) The polish should spread evenly and rub up easily; (2) it should not dry too rapidly as this necessitates working on a small area at a time; (3) it should not dry too slowly, otherwise it would take too long to do the job; (4) the polish should be easy of removal; (5) it should clean off all of the dirt and leave a bright finish without appearing to be oily; (6) in addition the product should be homogeneous, not one in which a cake of abrasive settles to the bottom or a layer of oil separates at the top.

Light grades of mineral oil of paraffin oil type are used as the oil constituent. A refined mineral oil containing no oxidizable material is preferable, as the oil film will be more lasting. The oil should not be too heavy as this results in a greasy finish. If it is too light, it may volatilize so completely as to have disappeared before the user works his way around the car. Mineral oils with specific gravity at 60° F. varying from 0.80 to 0.86 have been used. The amount present in various commercial polishes varies anywhere from 2 per cent to over 20 per cent, the quantity used depending somewhat on the rest of the ingredients. Sometimes the mineral oil is accompanied by a lighter fraction of solvent such as kerosene, naphtha or xylene. These serve as diluents for the mineral oil and also help dissolve grease in the soil to be removed.

The abrasive must be very soft so that it will not scratch. Diatomaceous earth is used very generally. The proportion present varies from 10 to 18-20 per cent. The most common emulsifying agent for general purposes is soap, and all varieties have been tried from soda soaps, triethanolamine soaps, morpholine soaps, and trimethylamine soaps, to soaps of various other amine derivatives. The trouble with using soap is that a polish emulsified with it does not give a very satisfactory gloss. Sulfonated oils have been used as the emulsifying agent, but enough of these remain on the finish after application to cause rain-spotting. As a consequence, most manufacturers have resorted to the use of water-soluble gums, such as gum tragacanth, gum arabic, Irish moss and

various other vegetable gums. From 0.1 to 0.8 per cent of these has been used in polishes, but practically, the amount necessary to give a stable emulsion of oil and water is apt to thicken the polish too much. Most auto polishes contain these gums, and because of this, are on the borderline of being too thick. Some formulators have compromised by using a mixture of soap and gum.

Quite often a wetting agent is incorporated in auto polish to hasten attack by the polish on the traffic film. The one most used is glycerin, although some manufacturers use a monohydroxy alcohol such as isopropyl alcohol. The amount varies from about 2 to 8 per cent.

Some polishes contain up to 1 per cent of wax and some contain none. One per cent of wax in a polish is more effective than might appear, it may actually be 10 per cent of the active polishing material consisting of oil plus wax. While the idea of adding wax is intriguing, too much wax will make the polish sticky and gummy.

A commercial cleaner-polish containing the simple basic ingredients discussed has the following formula:

	Per Cent
Light mineral oil	11
Diatomaceous earth	13
Water-soluble gum	0.5
Glycerin	3
Water	72.5

A wax-containing polish has the following composition:

	Per Cent
Mineral oil	10
Diatomaceous earth	11
Water-soluble gum	0.8
Glycerin	2
Wax	1
Water	75.2

A somewhat more complicated product contains:

	Per Cent
Mineral oil	9
Castor oil	3
Diatomaceous earth	7
Soda soap	0.5
Wax	0.5
Naphtha (Stoddard Solvent)	18
Bentonite	2
Water	60

The castor oil is intended to add to the depth of the luster produced by the mineral oil. However, such a mixture is hard to emulsify, and both soap and bentonite have been used to stabilize the product. Bentonite is not a satisfactory suspending agent because it makes rubbing more difficult, due to slipperiness. Naphtha is a grease solvent and a diluent for the mineral oil.

The following is higher in abrasive content:

	Per Cent
Light mineral oil	8
Diatomaceous earth	17
Carnauba wax	1
Water-soluble gum	0.2
Triethanolamine oleate	0.2
Water	68.6
Glycerin	5

The emulsifying agent is a 50-50 mixture of gum and special soap. Glycerin is present as a wetting agent, carnauba wax as a polishing agent in conjunction with the oil. The next formula is an example of a combination of volatile solvents with mineral oil:

	Per Cent
Light mineral oil	6
Kerosene	3
Xylene	4
Diatomaceous earth	9
Sodium oleate soap	0.2
Water-soluble gum	0.8
Water	75
Glycerin	2

A patented product uses sodium lauryl sulfate in combination with a gum as emulsifying agent.

Some polishes contain a small amount of dye. One advantage of coloring a polish is that color removed from the car on the cleaning cloth is not then so noticeable. Many products contain traces of odorants such as amyl acetate, although there is some prejudice against this odor as being associated with lacquer solvent.

While most of the cleaner-polishes are liquids, a few paste cleaners are sold. These are similar in composition but naturally contain less water:

	Per Cent
Mineral oil	13
Diatomaceous earth	30
Sodium stearate soap	3
Water	54

The method of preparation of cleaner-polishes is to mix the oil and solvent, if the latter is to be used, and suspend the abrasive in this. If any wax is added it is melted and poured with vigorous stirring into the warm mineral oil mixture. Gum tragacanth or similar gum is allowed to swell by soaking in a portion of the water overnight, when it can be stirred up with the rest of the water. If soap is used, it is dissolved in warm water. Glycerin or alcohol is stirred into the water phase containing the emusifying agent. The oil phase is then added slowly to the warm aqueous solution with vigorous stirring. When well mixed and homogeneous it is allowed to cool.

A DIFFERENT type of product is generally used when a car has been freshly washed. A cleaner-polish is not suitable for use on a wet car, as the cleaner-polish is supposed to dry before being rubbed up. For this reason, emulsion polishes are sold which can be applied to washed cars while they are still wet and which will give them the desired gloss. These polishes do not contain abrasive as their function is not to clean, but merely to produce a luster. They consist of an emulsion of mineral oil, usually some saponifiable oil, and water.

A typical emulsion polish contains the following:

	Per Cent
Light mineral oil	38
Castor oil	10
Potassium soap	1
Water	51

The presence of castor oil gives greater depth and brilliance to the polish than if the mineral oil were used alone.

Sometimes a diluent is added to the mineral oil as an aid to evaporation:

	Per Cent
Mineral oil	42
Castor oil	5
Ammonia soap	2
Xylene	5
Water	46

When a diluent such as xylene is added, the mineral oil can be some-

what heavier, as in the above it may have a specific gravity at 60° F. close to 0.9.

IN cases where the surface of an automobile has become roughened or a substantial amount of "dead" lacquer has to be removed, more drastic treatment is necessary and pre-wax cleaners or rubbing compounds are resorted to. The function of these products is to clean the surface thoroughly so that a polish in the form of wax can be applied later. The basis of the cleaner is a stronger abrasive than diatomaceous earth,—tripoli or amorphous silica being commonly used. The abrasive is usually suspended in kerosene and the latter emulsified with water with the aid of soap. Most of these products are pastes and so contain waxes to give them the right consistency. A representative product contains the following:

	Per Cent
Tripoli	27
Kerosene	25
Soda soap	3
Beeswax	4
Paraffin wax	4
Water	37

The kerosene helps soften the traffic film and makes a better lubricant when emulsified with water than it does alone. The liquid constituents serve as a carrier for the abrasive. Some cleaners contain a slight excess of fatty acid:

	Per Cent
Tripoli	48
Kerosene	25
Tallow soap	7
Waxes	3
Free stearic acid	1
Water	16

Carnauba wax may be present, as in this product:

	Per Cent
Tripoli	30
Light mineral oil	9
Petroleum naphtha	21
Sodium stearate soap	2.5
Carnauba wax	4
Paraffin wax	2
Water	31.5

Some of the products contain wetting agents such as glycerin, and some use a gum as emulsifying agent instead of soap.

While most of these products are pastes, a liquid can be prepared to serve the same purpose:

	Per Cent
Tripoli	30
Mineral oil	13
Castor oil	3
Sodium soap	0.5
Bentonite	1
Water	52.5

Another example of a liquid is the following:

	Per Cent
Amorphous silica	23
Light neutral oil	9
Blown castor oil	5
Glycerin	5
Soda soap	1
Gum tragacanth	0.5
Water	56.5

The pastes are usually applied with a damp cloth, the liquids poured on a dry one. Rubbing has to be continued until a smooth surface is obtained.

After a car has been cleaned with a rubbing compound, wax is applied to give a bright finish. These wax pastes may contain water or may be a simple dispersion of wax in organic solvent. The following is an example of the former:

	Per Cent
Petroleum naphtha	30
Mixed waxes	20
Soap	0.3
Water-soluble gum	0.2
Water	49.5

The wax mixture is usually composed of soft and hard waxes in varying proportions, sometimes a 1:1 mixture of two waxes or sometimes containing more than two waxes. Beeswax and paraffin are often used as soft waxes, carnauba or candelilla as hard waxes. Mineral waxes such as ozokerite are also used. Dry cleaners' naphtha is the usual carrier for the wax mixture. A typical composition is:

	Per Cent
Mixed waxes	25
Petroleum naphtha	75

A product having a high wax content can be made from the following:

	Per Cent
Petroleum naphtha	65
Paraffin or ozokerite	10
Carnauba or other hard wax	25

The ratio of soft wax to hard wax differs considerably in commercial products, some using a higher proportion of hard wax as in the above formula, others using as much as three parts of soft wax to one of hard wax.

Wax polishes are made very simply by melting the mixture of waxes together, just above the melting point of the higher-melting wax. The melted waxes are then mixed with the warm solvent with strong stirring. When thoroughly mixed, the batch is cooled quickly to give the smoothest possible dispersion of wax of fine particle size.

Advantages of a wax finish are that it can be rubbed up a number of times with a dry cloth to renew the luster. Grease and oil do not stick to a waxed surface the way they do to an ordinary finish, so that the waxed car actually picks up less dirt than one not waxed.

In considering wax polishes for automobiles and their application, one may be struck by the similarity to volatile-solvent types of floor wax which require buffing and which have been so largely displaced by no-rubbing emulsion floor wax.

Many people have thought that the principle of a self-polishing floor wax could be applied to an automobile wax. In spite of considerable effort, so far no one has been able to develop a satisfactory self-polishing automobile wax. The products developed just do not give the required gloss. It is possible that the problem will be solved some time and that eventually a rubless auto wax will appear that gives a good gloss.

The discussion of polishes and cleaners for automobile finishes has been based on the lacquer type of finish. Some makes of cars are now finished with synthetic resin varnishes which are not lacquers in the sense that they are not based on nitrocellulose. However, the same types of cleaners and polishes are being used successfully on these cars as on those with lacquer finishes. The products described can therefore be said to have more or less universal application for the cars of today.

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Floor Cleaning*

ECONOMY in floor cleaning, like in anything else, cannot be judged by the results of a week or a month. The average life of flooring materials is years, and it is on this basis that costs, efficiency and results must be judged. Use of a cleaner or soap which at an immediate saving of a cent or two per pound shortens by several years the life of a flooring material, can hardly be classed as economy.

It is so easy to save time in a floor cleaning job by using more concentrated solutions and less elbow grease, that this temptation is always present. The indiscriminate use of strong alkaline salts and gritty abrasives, certainly is an effective way to clean a floor in the shortest possible time.

What this kind of cleaning does to the floor, however, is another thing. When the surface begins to pit, erode, rot or chip, as the case may be, after a few years of this treatment, the cleaning problem then becomes really a problem. And the maintenance man begins to wonder why his floors are not standing up as well as they should.

Even under indifferent conditions of use, the right type of cleaning materials for specific types of floors will keep floors and floor coverings looking presentable for an incalculably longer period of time. The ideal floor cleaning compound for any given kind of floor would be one that would give maximum cleaning with a minimum of effort, have no corrosive effect, leave the floor bright and free from streaks or residue and yet produce neither a slippery nor a gritty surface. In addition it should be economical in use.

*Based on a survey as reported in the September, 1940, issue of *Soap and Sanitary Chemicals*.

Marble Floors

The porosity of marble is one of the main sources of trouble encountered in its care and maintenance. This is true especially of marble of the travertine type. As the lodging of dirt deep in tiny pores gives some kinds of marble an unclean appearance which is difficult to correct, maintenance men often resort to use of alkaline salts such as trisodium phosphate or sodium metasilicate. These definitely have an injurious action on marble and eventually mar its fine satin-smooth finish. One theory attributes the destructive effect to a physical action. The dissolved alkaline salts, runs the theory, penetrate into the porous stone where they cannot be rinsed out, entirely. As the water evaporates, the salts crystallizing out of solution expand against the marble exerting a pressure similar in effect to that of ice crystals in natural weathering of rocks. The resultant pressure causes "spalling." Small pits form in the surface which multiply and enlarge as times goes on until the entire surface is injured beyond repair. Acting on this theory, the superintendent of one large office building permits his employees to use nothing but plain hot water in cleaning his marble floors.

Since marble is a comparatively soft stone, it is to be expected that scouring compounds containing hard abrasives would tend to scratch its surface. Scouring compounds, therefore, are barred as cleaners for marble unless it is definitely known that the abrasives in the formulation are of a soft, flaky nature.

Liquid scrub soaps of the potash type seem to be most suitable for cleaning marble floors. They give good cleaning action even when floors are not washed carefully, and they are easily rinsed off. Many types of soap including triethanolamine soaps, certain soda soaps, pine scrub soaps and others are recommended for use on marble floors by manufacturers.

Tile Floors

Tile floors of all kinds, whether vitreous, semi-vitreous, glazed or faience, are able to withstand the action of alkalies and other chemicals better than any other flooring materials. For this reason, soaps containing alkali salts, or alkali salts alone can be used in cleaning tile floors with little risk of impairing the surface or colors. Trisodium phosphate is commonly employed as a cleaning agent for tile because of its low cost. In connection with its use, the usual tendency of janitors and porters is to use a much more concentrated solution than is necessary. Even at the higher concentration, however, the alkali does not attack most tiles except after prolonged contact seldom met under ordinary conditions. Rinsing the floor after it has been washed should be done thoroughly to reduce slipperiness. Abrasive cleaning compounds are sometimes used to combat slipperiness but these tend to leave the tile unpleasantly gritty.

Soap powders and liquid soaps also find extensive use on tile. An oft-repeated claim of the superiority of soaps over alkali detergents is based on the lathering power of soaps. The suds, one theory maintains, present a larger surface area, provide better suspension of the dirt particles and remove them from the "reaction," allowing the reaction "to go to completion."

Terrazzo Floors

Fabricated of marble chips imbedded in concrete, terrazzo should

be treated in much the same way as marble floors. Many of these floors go to pieces rapidly due to the harsh alkali cleaners and abrasives used in cleaning them. The expansion of alkali salt crystals that have seeped in between the chips creates a great deal of pressure and the marble chips will often release their hold and come out of the concrete base.

A rosin soap at a concentration of two ounces to ten quarts of water is used every night to clean the terrazzo on the main floor of one of the largest buildings in New York. In other parts of the building where traffic is less heavy, floors are cleaned much less frequently, of course. A proportion of only two ounces of rosin soap to ten quarts of water was found to be sufficiently effective, although abrasives are occasionally used to supplement the work of the soap as required.

Old terrazzo floors upon which has been formed what is called an "alkali ice film" due to improper cleaning methods, can be reconditioned with an acid cleaner. Sodium acid sulfate should be mixed with an abrasive,—the proportion of abrasive depending on the thickness of the film. For general work, a mixture of 25 parts of the acid salt and 75 parts of abrasive is found to be satisfactory. This should be used only when absolutely required, for even weak acids readily attack marble. When used they should be removed completely. After the film is removed, the appearance of the floor can be greatly improved by scrubbing with a neutral potash soap solution and then polishing with a machine.

Wood Floors, New

Wood is the most absorbent of all materials used for floors. An unsealed new wood floor is so adversely affected by water that scrubbing is now regarded as almost obsolete, and yet, unfortunately, considerable scrubbing is still being done. Wood floors that have been treated with penetrating seal and wax do not require cleaning with soap and water as long as the protective coating of wax is kept in good shape. The surface dirt can ordinarily be removed by brushing with a soft hair brush and then using a damp cloth over the brush to eliminate all traces of dirt.

Wood Floors, Old

In reconditioning old wood floors that have been saturated with oil for several years, or floors on which the finish has been badly worn and scarred, sanding is used to prepare the surface before the application of a seal. However, in many cases sanding would be too expensive or a waste of time. Where these conditions prevail, it is advisable to scrub the floor thoroughly with a strong alkaline soap solution. Abrasives should be avoided. The solution should be agitated on the floor with a stiff brush or a scrubbing machine to loosen the oil and grime. The floor should be rinsed with hot water several times and then mopped to take up as much water as possible. After thorough cleaning, the floor should be allowed to dry for twenty-four hours or more before applying penetrating seal. Where it is desired to remove the old wax from hardwood floors, a dilute solution of trisodium phosphate can also be used.

The use of soda soaps on wood floors has been frowned upon by some experts on the theory that the sodium will replace the potassium of salts naturally present in the wood, causing it to become pulpy and to splinter. While the validity of this reasoning has been questioned by some soap manufacturers as slightly far-fetched, most of them agree that vegetable oil potash soaps are best for wood floors wherever the use of soaps is necessary.

Linoleum Floors

Linoleum and similar linseed oil composition floors should last for many years and will if properly maintained. The most important rules in cleaning linoleum are to avoid using abrasives and soaps or detergents with a strong alkaline reaction. Alkalies attack linoleum, softening it and destroying its wearing properties in time, while abrasives cut the top surface. When cleaning is necessary, a mild potash soap made from linseed oil, soy bean oil, or corn oil is generally recommended. The soap should be rinsed away thoroughly. using clear water which should be used sparingly so that the floor will dry as quickly as possible. Water should never be allowed to get underneath the floor covering. The floor must always be allowed to dry thoroughly before wax is applied. In the event that the cleaner is not entirely removed before waxing, the slipperiness of the surface is liable to be greatly increased. Sweeping compounds containing oil, sand or chemicals should not be used, nor should gasoline, benzene or other organic solvents be permitted to come in contact with linoleum flooring. They soften and discolor the floor.

Cork Tile

The same precautions followed in cleaning linoleum should be observed in maintenance of cork tile. It is, however, more resistant to abrasion, but is more susceptible to absorption of moisture than linoleum. Care should be taken, therefore, not to use too much water in washing it and to avoid water getting under the cork tile where it would have a tendency to cause swelling and rotting.

Rubber Floors

Apparently rubber floors are the only type of floor surface on which all soaps are specifically tabooed by floor manufacturers. The nature of rubber floorings is such that almost every kind of scrubbing or scouring compound is said to have a harmful effect upon it. Neither alkaline nor acid cleaners should ever be used. Abradant cleaners which come in powder form should also be avoided. Although sweeping will usually suffice for the maintenance of rubber floors which are protected with wax, some cleaning is eventually necessary to remove traffic marks and dirt film. The manufacturers of rubber tile recommend their own cleaning powders, the ac-

tive ingredient of which appears to be sodium sesquicarbonate. Just why sodium sesquicarbonate should be less harmful to rubber floors than a good grade of neutral potash soap is a controversial point open to much discussion. Experience seems to show that if soaps are used to clean rubber floors and are not completely rinsed off, they will contribute to the premature disintegration of the floor. When they are used in dilute solution, however, and are carefully rinsed off, it is doubtful whether their occasional application as required will damage these floors.

Asphalt Floors

Floors in this classification may be termed soft composition for they are the most easily indented and most easily injured by abrasives of all the flooring materials. Mastic, troweled asphalt and asphalt tile are included in this group. Like most composition floors, asphaltic floors are corroded by oils, greases and organic solvents, but are the least affected by water of all resilient floorings. They also have a greater resistance to alkalies and other chemicals than other composition floors.

Any good quality floor scrub soap can be used in cleaning asphalt floors as long as it contains no oils or solvents. Since most potash soaps designed for regular floor cleaning contain a maximum of 3 per cent of pine oil and are used in highly diluted solutions, the percentage of pine oil is negligible in the soap as used in respect to its solvent effect on asphalt floors. Rosin soaps containing a percentage of wax are reported used in one large office building in maintaining mastic floors to serve the double purpose of cleaning and finishing. In use, the rosin soap-wax compound is not completely rinsed off, but is polished into the floor with a buffing machine. This treatment is said to produce a non-slippery surface.

Felt Base Floors

These floors consist of a fairly thin veneer of paint laid on a foundation of felt. Rough treatment in cleaning will remove the painted pattern, cause chipping and cracking of the veneer and disintegration of the base material. The life of felt base floors is comparatively short at best, but if the use of strong alkalies and abrasives is avoided, they will give more satisfactory service. More floors are scrubbed away than are walked away, and this applies particularly to felt base floors.

Painted Floors

The frequency with which a floor needs painting is determined to some extent by the cleaning methods used on it as well as the amount of traffic. Alkali salts and abrasives will naturally remove paint quickly, but liquid soaps sold for the purpose of floor maintenance are quite suitable for painted floors whether they are concrete or wood. Several liquid cleaners in emulsified form are sold expressly for painted surfaces and are guaranteed not to injure them. One contains 5 per cent of triethanolamine soap, 35 per cent of water and the balance kerosene. This product carries a strong odor of kerosene.

Concrete Floors

There are many compounds on the market designed for the rough cleaning jobs on floors in garages, factories, and elsewhere where heavy deposits of grease, oil, tar, etc., must be removed. Two general classes of products are sold for these "heavy duty" cleaning operations, (1) liquid or paste products which are generally used dissolved in some strong solvent, such as kerosene, and which are emulsifiable and can be washed away with water, and (2) mixtures of strong alkalies used in water solution, sometimes with admixture of some wetting agent or soap. Abrasive materials are frequently very effective for aiding in heavy grime removal, but where the material is flushed down the sewer, the constant use of any insoluble material is not good practice.

The liquid products are all sorts of mixtures, and because the question of floor damage is not a serious one, the limits on composition are few. However, these products must be cheap. Compounds containing 10 to 40 per cent of creosote oils along with varying proportions of pine oil, kerosene, and a soap, possibly a rosin soap, are quite widely used. These products are something akin to a cheap disinfectant. They have the advantage of being usable in kerosene oil, having strong solvent and softening action on grease, being emulsifiable and readily washed away with cold or hot water. Similar products are made using naphthenate soaps, coal tar oils, and solvents, as well as other mixtures. These products are used in connection with heavy duty scraping or with stiff brushes, according to the cleaning problem.

The alkaline cleaners are numerous, trisodium phosphate, soda ash, sodium metasilicate, and even caustic soda finding use in mixtures. These are used in various ways in water solution. Regular low-grade soap powders containing five to eight per cent of soap also find wide use in this type of cleaning. The soap and alkaline cleaners are suitable for factory floors where hot water is available and the grease deposits not too heavy. For garages and oil plants and the like, the solvent cleansers are more effective. However, the question of offensive odor is one to be considered in use of the latter. In general factory use, especially in food factories, meat plants, etc., the regular alkaline and soap cleaners are still used almost exclusively on floors.

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Glass Cleaners*

ONE of the most cogent reasons for the growing popularity in recent years of windshield and glass cleaners no doubt lies in the fact that they are usually sold and used with a handy spraying device. This permits a light, even distribution of the liquid over the surface of the glass in a moment's time, an ideal method of application not only from the point of view of the labor involved but also from the cleaning end. The spraying device, probably even more than the particular liquid used, constitutes an advance in the saving of labor and time.

Nine times out of ten, the problem of cleaning windows, mirrors, show cases, windshields and other flat glass surfaces is the same, because in most cases the layer of soil to be removed is relatively light. Any method that succeeds in the one case should be equally applicable to the other. The soil consists of a thin film of oil covering the glass surface, with minor amounts of dust, dirt and grime adhering.

With this in mind, one observes that detergency as a property of glass-cleaning fluids is not necessarily of first importance. It is true that the soil has to be wet but this can be accomplished without the use of either soap, or the type of compound usually classed as a "wetting agent." What actually happens is that one wets the glass and then rubs the dirt off on a cloth or a towel, the friction of the cloth and the energy of rubbing being the means for removal of the soil.

While soap solution is of course an excellent wetting agent, it is unsatisfactory for washing glass because it is hard to rub dry and more particularly because enough soap remains on the glass to leave a cloudy effect instead of a clear bright surface.

The largest number of successful glass cleaners now on the market are based on alcohol of one kind or another, ethyl, methyl, isopropyl, etc. An alcoholic solution makes a better wetting agent than water alone. A second advantage is that alcohol is more volatile and the alcoholic solution tends to dry more quickly than water. This speeds up the drying process so that the glass requires less rubbing. A third advantage is that since alcohol is itself a liquid, no solid deposit can be left from it on the glass.

The amount of alcohol present in commercial glass cleaners varies all the way from a few per cent up to 95 per cent. The higher the alcoholic content, the quicker the liquid dries, and the more efficient it is in cold weather, especially at temperatures below the freezing point of water. For ordinary use it is considered advisable to set the alcohol content at not less than 20 per cent, and preferably well above this figure.

Although completely denatured alcohol can be and is used, this has a disagreeable odor and is often avoided for that reason. Specially denatured alcohols are quite suitable and can be purchased under government regulation, but the amount of red tape involved makes it hardly worth the trouble. Isopropyl alcohol costs only slightly more than specially denatured ethyl alcohol, can be bought freely and serves the purpose exactly as well as ethyl alcohol.

Another means of avoiding the purchase of government-regulated specially denatured alcohols is the use of special solvents. These are sold under various trade names as proprietary solvents. They are based on modifications of a standard alcohol formula known as SD-1-modifications which make them substantially "completely denatured" rather than "specially denatured." As sold, 100 parts of 190-proof or 95 per cent alcohol have added to them 5 parts of ethyl acetate denatured with 1 part of aviation gasoline and a very small amount of wood alcohol, not sufficient to require a poison label on the container. These special solvents serve as the practical means of avoiding the nuisance of government regulation, permits, reports, etc.

One of the best known and most successful glass cleaners contains a dihydroxy alcohol, specifically, about 3 per cent of ethylene glycol. This does not appear to be patented in the United States; a Canadian patent was obtained on this composition some years after the product had been marketed here, but not by the original discoverer. Ethylene glycol does not function in the same way that a monohydroxy alcohol does in that the former does not act as a wetting agent. It balls up in droplets on a glass surface in the same way that water does. It certainly has no detergent action. However, applied in very dilute solution as a spray, it can be wiped off a glass surface very quickly and easily, possibly more easily than ethyl alcohol. It does not owe this effect to evaporation since ethylene glycol is not a volatile liquid. It is hygroscopic, so that possibly a slippery invisible film of liquid remains on the glass, making it very easy to rub off excess liquid.

Glycerin, a trihydroxy alcohol, works to some extent, but not nearly as well as ethylene glycol, as glycerin in a very thin film tends to be more gummy. Perhaps the best way to describe the effect of ethylene

*Based on an article by Dr. C. A. Tyler in the November, 1940, issue of *Soap and Sanitary Chemicals.*

glycol is that it acts as a lubricant. The dirt is still removed by the cloth or towel, but the energy required to rub off the moistened layer of soil is reduced to a minimum.

Diethylene glycol acts the same as ethylene glycol. A commercial product combines lubricant and wetting action by its content of about 1 per cent of diethylene glycol and about 45 per cent of isopropyl alcohol. The latter hastens drying and also helps to moisten soil of a fatty or oily nature. A similar product contains 35 per cent of denatured alcohol and 1 per cent of ethylene glycol. The lubricant effect would probably be much better if the glycol content were increased to about 3 per cent. Too much cannot be used, as this defeats its purpose by making the rubbing more difficult.

With the great majority of these products, the bottle represents the major cost in materials, with a price in the neighborhood of 3 cents each, according to style and quantity. The spraying device is often sold as a separate item, made to fit a standard cap for these small bottles, its cost in turn being greater than that of the bottle.

One commercial cleaner combines alcohol with ammonia, while another contains ammonia only as the active ingredient. While ammonia water acts as a wetting agent and evaporates quickly, leaving no residue, it possesses the disadvantages of an unpleasant and penetrating odor besides having an irritating effect on hands, eyes and noses.

The professional window cleaner still uses a dilute solution of trisodium phosphate. This he applies quickly with a brush and then runs over the wet surface with a squeegee, sometimes drying the corners with chamois. The solution of trisodium phosphate is a good wetting agent for the oily film on the glass. When rubbed dry with a cloth as is ordinarily done by the automobile service man and the housewife, more rubbing is required than when a volatile liquid is used. As trisodium phosphate is a white crystalline salt, there is theoretically a tendency for a light deposit of the solid material to remain on the glass, causing streaking. While trisodium phosphate is an excellent agent for soaking up and thus helping to remove the soil, it does not leave as brilliantly clear a surface as can be obtained with a solution of a volatile liquid.

Perhaps taken from the practice of window washing with trisodium phosphate is a commercial product in tablet form, each tablet to be dissolved in a half pint of water. Further instructions on the label say that "if fast drying is desired add a little alcohol." The tablets consist of a salt mixture made up of about 89 per cent of borax and 11 per cent of sodium metaphosphate. Borax possesses only a very mild degree of wetting power and sodium metaphosphate possesses even less. The use of this combination in a window cleaner shows that the manufacturer does not understand the nature or function of the compound.

Another glass cleaner sold in tablet form contains as its active ingredient a synthetic wetting agent. This is combined with Seidlitz powder which is a mixture of an organic acid with sodium bicarbonate and other alkaline ingredients. When the tablet is dropped into water, effervescence occurs producing carbon dioxide. This causes the tablet to disintegrate rapidly, thus dissolving more readily.

Prepared solutions of some of the synthetic detergents have been tried as glass cleaners, a solution of a sulfated organic detergent still being sold. Such a liquid should have good wetting action, but being a solution of a solid material may show a tendency to produce streakiness on the cleaned glass surface. If one wishes to try out new compounds for this purpose, it might seem desirable to seek one which is itself a liquid at ordinary temperatures. It does not necessarily have to be a volatile liquid, as demonstrated in the case of ethylene glycol. Some of the new quaternary ammonium compounds which were developed as wetting agents for use in the textile industry are liquids and should qualify as good glass cleaners. The practical aspect of this is that the cost of such compounds is very high as compared with the cost of the alcohols and glycols.

Most glass cleaners contain a trace of water-soluble dye, many of them being a light sky-blue which matches as closely as possible the color of the first nationally advertised product in the field. The color, of course, has nothing to do with it, since all of the compounds discussed give colorless solutions. Dyes were probably used in the first place to convince the user that the products were something special and not just plain water.

Since most of the commercial products are simple alcoholic solutions, they have practically no odor of their own, or possibly a slight odor of ethyl acetate from the denaturant. There being no unpleasant odor to cover up, most products have no odorant added. A few contain a trace of perfume, usually a pine-type odorant. Any use of a perfume is purely psychological.

The housewife in cleaning windows does not have to meet the main problem which besets the motorist, that of dead insect removal. These cannot be simply brushed off and they cannot be easily washed off. They behave as if stuck on with glue, as is actually the case since heat bakes the protein present in the body fluids of the insects onto the windshield and leaves a hard crust.

The best way to get baked or dried protein off a glass surface or any other surface is to scour it off. No simple wetting agent or detergent solution will do the trick. It has been claimed for a number of liquid products that they will dissolve dead insects, but no solvent on earth will do this. A scouring agent containing abrasive is the thing to use. Some garage workers use a well known brand of scouring powder which consists essentially of feldspar, excellent for the purpose since the particles occur in the form of flat platelets which do not scratch readily.

(*Turn to Page* 166)

Evaluating Insecticide Odors*

CONFRONTED with the problem of selecting suitable odors for a line of liquid spray insecticides, a study was made and a procedure devised of interest to both manufacturers and users of such products. The procedure was developed along the lines of a performance test that would be comparatively simple to perform, and not involve the use of expensive apparatus, yet give results that would have practical value.

The logical approach was first to determine what factors or characteristics must be evaluated. Before actual testing was attempted it was apparent that four characteristics would surely have to be considered.

1. Odor of the insecticide in the container.

2. Character of the odor when the product is sprayed.

3. Persistence of the odor after spraying.

4. Permanence of the odor in storage.

With these factors in mind, initial tests were made and it then became evident that additional characteristics required evaluation. These were:

5. Initial masking power of the odor.

6. Continuity of masking power.

7. Continuity of odor character.

8. Tendency to offset traces of irritation in certain cases.

Equipment

1. A small room remote from interfering odors, the cubical contents to be from 200 to 600 cubic feet. The ceiling height should average between 8′-6″ and 10′, the walls smooth and of a material that will stand repeated cleaning with a dampened mop. It should have at least one window and any hangings, furniture, or other objects upon which the spray might settle should be removed. The advisability of using the regular Peet-Grady chamber (216 cu. ft.) is problematical chiefly on account of the low ceiling which would defeat one desirable object of the procedure, namely, to parallel actual application as closely as possible.

2. An average quality hand sprayer was used, the hand type being chosen for two reasons. First it is lower-priced than a power sprayer, and secondly, it is less efficient and therefore the droplet size in the mist produced will undoubtedly be larger. It seems reasonable to assume that this larger droplet size would have a tendency to accentuate the undesirable odor characteristics of products being tested. The sprayer used in this particular series of tests was a small size, low priced gun with a glass bowl of about 100 c.c. capacity.

3. A graduated cylinder of about 100 c.c. capacity. The common 4 ounce graduate with a cubic centimeter scale is most convenient and readily obtainable.

4. A motor driven fan to hasten the removal of residual odors from the test room.

5. An ordinary long-handled mop to remove accumulation of spray residue from the walls and ceiling of the test room.

6. Small containers preferably of the kind used to package the product.

Procedure

Measure 1 c.c. of the sample for each 16 cubic feet of space in the test room which is approximately the same concentration used for determining killing power in the Peet-Grady chamber. The room should be free from any odor. Then after closing windows and door spray the insecticide uniformly around the top portion of the room. During and after the spraying operation make the following observations.

1. While spraying:

(a) Note if odor is pleasing.

(b) Note the degree to which the odor of the insecticidal principle and base is masked or neutralized.

(c) Note any tendency toward a tingling sensation in the nostrils or smarting of the eyes.

2. Repeat the same observations at the following intervals after spraying is completed: 2, 5, 15, 30, and 60 minutes.

The observer should leave the test room between observations keeping away from exposure to other odors of any kind. By so doing it was noticed that more clearcut and definite recognition of the odor characteristics resulted. To avoid dilution with outside air such exits and subsequent entries should be made as quickly as possible. It is also desirable to have a second observer check the first operator during the progress of the test.

At the end of 60 minutes, which might be termed an arbitrary end point, the windows and door should be opened, the fan started, and the ceiling and walls gone over with a damp mop. Paper was used on the floor and removed after each test.

Odor In the Container

Place samples of the insecticides under examination in small containers of the same type used to package the product. Identify by a letter or number and pass these blinded samples around to a group of observers, asking them to signify the order of desirability in which they would arrange the samples after observing the odor by simply removing

*Based on an article by J. C. Booser in the October, 1940, issue of *Soap and Sanitary Chemicals*.

the container top and smelling the contents. Get their reaction as to whether they can detect any underlying objectionable odors that are not covered by the masking agent.

Permanence of Odor In Storage

To determine this characteristic, samples of insecticide should be examined after a predetermined period for retention of the original odor and masking characteristics. In this series of tests out of 75 formulas stored for one year, only five were found to have deteriorated to a noticeable degree.

Interpretation of Requirements

The following requirements were established at the time initial tests were made.

1. The odor of the finished insecticide in the container shall be pleasing and shall completely mask all objectionable odors.

2. The odor of the insecticide when sprayed in the stipulated manner and concentration shall be pleasing.

3. The odor after spraying shall not persist more than 60 minutes. Dissipation within 20 minutes would be desirable, but none of the products tested met such a requirement.

4. The odor shall retain original characteristics in the insecticide solution for at least 12 months.

5. The odor of the insecticide when sprayed shall completely mask all objectionable odors present in the product.

6. The masking power shall last throughout the entire period over which the odor persists.

7. The pleasing character of the odor as sprayed shall last throughout the entire period over which the odor persists.

8. The masking power of the odor shall be sufficient to offset any tingling sensation in the nostrils or smarting of the eyes when the insecticide is sprayed.

It is significant to note that only 5 per cent of the samples in the group tested met all eight requirements. Of the others over half failed on requirement 3 only, which in some cases might warrant acceptance as a satisfactory product.

Comments

An unexpected phenomenon was noticed during this study. It was observed that there was a marked relationship between masking power and the elimination of slightly irritating characteristics peculiar to certain types of sprays. Given two odors, one of which completely masked the insecticidal principle, the other with a masking power just a trifle short of covering the principle, the former produced better results. The observer's reaction was that the degree of reduction was all out of proportion to the relative masking powers of the two odorants. The one that completely masked the principle eliminated practically all of this physiological effect, whereas the other odorant did not suppress the aforesaid effect to near the vanishing point as might be expected. In all the cases observed the irritating effect was quite pronounced but of course the reduction was greater than in those samples containing odorants which had poor masking power.

Another characteristic which was not investigated but which might well repay study is the tendency of the sprays to impart taste or odor to exposed food. In all of these tests the desirability of having a fairly extensive group of observers to judge the blind samples cannot be emphasized too much. In the study being reported upon a rather surprising coincidence of critical judgment was obtained.

The rough set of methods here outlined carries no pretense of being a truly scientific or precise laboratory procedure, but is offered as a rough practical performance test method. It is hoped that it may stimulate further study toward the establishment of a standard method for judging the merits of odorants for insecticides, and the acceptability of the odorized product on the part of the purchaser.

Glass Cleaners

(*From Page* 164)

Scouring soap in bars and paste are also used. Glass is hard enough so that mild scouring powders containing feldspar, amorphous silica or diatomaceous earth, will not scratch it.

A paste product developed primarily for cleaning glass contains about 5 per cent of wax, 2 per cent of triethanolamine soap to serve as emulsifying agent, 15 per cent of kerosene, 15 per cent of diatomaceous earth, and the rest water. It is probably thought that a light film of wax left on the glass will give it a better luster and help protect it from soil. The kerosene is more than a mere wetting agent, it is a solvent for greasy matter in the soil. The solvent loosens the dirt quickly, while the soft abrasive aids in the removal of solid dirt particles and the remains of insects.

A number of metal polishes are recommended by their manufacturers as glass cleaners. Where scouring is required they should prove satisfactory provided the abrasive present is not too harsh. Most high-grade brass polishes contain amorphous silica as abrasive, which should not scratch glass. Many of them contain ammonia soap as emulsifying agent and a small excess of ammonia. Some of them also contain a small amount of alcohol, so that the general nature of the product is not incompatible with that of window cleaners.

Abrasive cleaners, whether used in the form of scouring powders or metal polish, serve only as a last resort where stringent methods are required. No garage man likes to use such products, for they require a good deal of hard work to apply. Nevertheless drastic methods are required when windshields are badly smudged with insect bodies. Although a number of products intended primarily for some other purpose are applicable, one precaution to observe is the avoidance of harsh scouring powders containing crystalline silica such as are used for scouring tiled floors, etc.

Comments on Dry Mixing*

THE horizontal type powder mixer fitted with spiral agitators finds widest application for both free flowing mixtures, such as bath salts, para crystals, detergents, or sweeping compounds, and non-free flowing impalpable powders such as talcs, tooth powders, soap powders, and insecticides. Satisfactory mixing of a given mixture in this equipment is often dependent upon the type of agitator with which it is fitted. If there is any tendency toward discoloration, the material from which both the body of the mixer and the agitators are constructed, should be given consideration.

If there is an appreciable difference in density of the impalpable powders to be mixed, the batch size should be small enough so that the agitating device breaks through the top of the batch. In fact, this is always good practice, as the double helical blades then carry the material from the bottom not too violently to the top. If the mixer is filled too full, the mixing time may be appreciably increased.

Being a simple mechanical mixture, the batch is often allowed to mix needlessly long with attendant waste of power. Again, to keep up with the filler, it may not mix long enough. It is not uncommon to find that certain mixtures have an optimum length of time for mixing. There may be a cyclical movement of particles if there is little or no tendency to form agglomerates. The batch may approach uniformity; *then recede* again.

This idea has been long and widely used. To prove or disprove it, four dissimilar products were mixed in mixers of similar construction. Face powder containing very light zinc stearate and relatively heavy zinc oxide and talc, was found to mix to uniformity then hold it regardless of continued mixing. This same was found true of tooth powder containing light magnesium carbonate and powdered castile soap and a mixture of dense and light chalks.

Baking powder containing, with other ingredients, light redried starch and sodium aluminum sulfate which has a very heavy apparent density, acted differently. Samples pulled at intervals varied appreciably in available carbon dioxide. Powdered ammonia composed of ammonium chloride and sodium bicarbonate and carbonate, also showed a variation in available ammonia as mixing was continued for a protracted period.

It would seem to be indicated that mixing time may advantageously be studied. If there is cyclical effect, the upper and lower limits can be ascertained and the mean set up as standard practice. If there be none, then the mixing time at which satisfactory uniformity is attained, can be set up. Capacity can thereby be increased by avoiding over-running, and at least a power saving will be effected. A by-product of standardized mixing time in most colored mixtures, is an appreciably more uniform tint from batch to batch.

The pony mixer and its modifications, are ordinarily not looked upon as suitable for dry mixing. However, for mixtures that do not dust, they may prove suitable. The agitation is provided by vertical blades so that attrition is much less than in a horizontal mixer. Change cans or tubs are provided so that the batch may be promptly and conveniently moved and the next batch put in place for mixing. The tub can be conveniently elevated and dumped into the hopper of the filler. This is particularly advantageous where mixer and filler are on the same floor.

Ball or pot mills still find wide application. For example, perfume can be intimately mixed with a part of the talc or magnesium carbonate in face powder in such a mill. Where pigment or lake colors are employed in a formula, they may be conveniently extended. Not only is the final mixing facilitated, but the accuracy in color matching, as well.

For convenience in identification of such prepared-in-advance extended materials they may be called, for example, red toner S. F. (meaning semi-finished) to differentiate it from the original color. The same principle may be applied to other dry blending operations. If two or more basic colors are used to obtain the desired tint, they need not be separately prepared. They are all weighed into the extending material in correct proportions and milled together into one "semi-finished."

Where more than one product must be mixed in one mixer, careful planning will be helpful in establishing a cycle to minimize cleaning. Cleaning of the whole system, including mixer, filler, hoppers, etc., is tedious and time consuming. When seven different shades of face powder were so handled, the cycle was started with the lightest and concluded with the darkest. Only one cleaning after the darkest was necessary. After reasonably thorough cleaning, "blank," i.e., untinted powder was run through the system for final cleaning. After repeated use when it became discolored, it was utilized in a dark shade.

*Based on an article by Ralph H. Auch, in the April, 1940, issue of *Soap and Sanitary Chemicals.*

29

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Liquid Soap Base
Liquid Soaps
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Mottled Soap
Oil Soaps
Salt Water Soap
Scouring Powder
Scouring Soap
Scrubbing Soap (liquid)
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Specifications*

Chip Soap (P-S-566)

Chip soap shall be a soap in chip form made from soda and fats, without rosin, as free as possible from water and all substances other than true soap, of a light uniform color, free from disagreeable odor, and suitable for highgrade laundry work with soft water, when the presence of alkaline salts is objectionable.

Matter volatile at 105° C. shall not exceed 15 per cent. Deliveries which yield more than 15 per cent of volatile matter will be rejected without further test. The sum of free alkali, total matter insoluble in alcohol, and sodium chloride shall not exceed 3 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.5 per cent. Matter soluble in water shall not exceed 0.4 per cent. Titer of the mixed fatty acids prepared from the soap must be not less than 39° C. The percentage of matter volatile at 105° C. will be computed on the basis of the soap as received, but all other constituents will be calculated on the basis of material containing 10 per cent of volatile matter.

Cake Grit Soap (P-S-571)

Cake grit soap shall be of the following types as specified: Type A—for fine work, such as glass and enamel; Type B—for scouring and scrubbing.

Type A—

Matter volatile at 105° to 110° C. shall not exceed 4 per cent. Deliveries which yield more than 4 per cent of volatile matter shall be rejected without further test. Alkali as alkaline salts (total alkalinity of matter insoluble in alcohol), calculated as sodium carbonate (Na_2CO_3), shall not exceed 1 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Insoluble siliceous material shall be not less than 88 per cent nor more than 93 per cent. The insoluble siliceous material shall consist of not less than 90 per cent of ground feldspar. All of the insoluble siliceous material shall pass through a No. 100 sieve, and the residue retained on a No. 200 sieve shall not exceed 5 per cent. Rosin, sugar, and foreign matter shall not be present. Anhydrous soda ash shall be within 1 per cent of the difference between 100 and the sum of the matter volatile at 105° to 110° C., insoluble siliceous material, and alkali as alkaline salts. The cakes shall be well compressed and of a satisfactory degree of friability, which shall not be materially affected or lessened after immersion in or contact with water. The material shall not scratch glass or enameled surfaces. The material shall be unscented and shall be of a light gray or white color.

Type B—

Matter volatile at 105° to 110° C. shall not exceed 5 per cent. Deliveries which yield more than 5 per cent of volatile matter shall be rejected without further test. Alkali as alkaline salts (total alkalinity of matter insoluble in alcohol), calculated as sodium carbonate (Na_2CO_3), shall not exceed 3 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Insoluble siliceous material shall not be less than 75 nor more than 85 per cent. The insoluble siliceous material shall be mainly quartz, and it all must pass through a No. 100 sieve. Rosin, sugar, and foreign matter shall not be present. Anhydrous soda soap shall be within 1 per cent of the difference between 100 and the sum of the matter volatile at 105° to 110° C., insoluble siliceous material, and alkali as alkaline salts. The cakes shall be well compressed and of a satisfactory degree of friability, which shall not be materially affected or lessened after immersion in or contact with water. The material shall be unscented and shall be of a light gray or white color.

Hand Grit Soap (P-S-576)

Hand-grit soap shall be a cake soap containing about one-third its weight of clean, finely divided insoluble siliceous matter, as free as possible from water, uncolored, unscented unless otherwise specified, thoroughly saponified, and well compressed in firm, smooth cakes.

Matter volatile at 105° C. shall not exceed 25 per cent. Deliveries which yield more than 25 per cent of volatile matter will be rejected without further test. Alkali as alkaline salts (total alkalinity of matter insoluble in alcohol), calculated as sodium carbonate (Na_2CO_3), shall not exceed 1 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Insoluble siliceous material shall be not less than 25 nor more than 40 per cent. The insoluble siliceous material shall not yield more than 2 per cent of residue retained on a No. 100 sieve and not more than 10 per cent of residue retained on a No. 200 sieve. Rosin, sugar, and foreign matter shall not be present. Anhydrous soda soap shall be within 1 per cent of the difference between 100 and the sum of matter volatile at 105° C., insoluble siliceous material, and alkali as alkaline salts. The percentage of matter volatile at 105° C. will be computed on the basis of the soap as received, but all other constituents will be calculated on the basis of material containing 25 per cent of matter volatile at 105° C.

Liquid Laundry Soap (P-S-586)

Liquid soap for laundry use shall be a clear solution of pure potash (or potash and soda) soap

* General and detailed Requirements as specified in the Standard Stock Catalogue of the U. S. Federal Specifications Board.

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with or without glycerol or alcohol and containing not less than 12 per cent by weight of a volatile organic solvent or a mixture of such solvents. It shall yield a clear solution on mixing with soft water, shall quickly form a satisfactory lather, shall have no injurious effect and leave no objectionable odor on fabrics. Materials washed with this soap shall have, after drying, a soft feel and not appear more boardy or stiff than when washed with soft water.

The material shall be a clear solution, shall yield a clear, homogeneous solution on mixing with soft water, shall quickly form a satisfactory lather, and shall leave no objectionable odor on fabric. Total anhydrous soap shall be not less than the equivalent of 24 per cent potash soap. Total matter insoluble in alcohol shall not exceed 0.5 per cent. Free alkali, calculated as potassium hydroxide (KOH), shall not exceed 0.05 per cent. Chloride, calculated as potassium chloride (KCl) shall not exceed 0.3 per cent. Total matter insoluble in water shall not exceed 0.1 per cent. Volatile organic solvent shall be not less than 12 per cent. All constituents shall be calculated on the basis of the original sample. Fabric washed with the liquid soap shall show no more shrinkage or felting than occurs with similar fabric washed with soft water at the same temperature. Colored materials when washed with this soap shall not fade more than when washed the same number of times at the same temperature with soft water alone.

Ordinary Laundry Soap (P-S-591)

Ordinary laundry soap shall be a well-made, uniformly mixed laundry or common soap, made from soda and fats, with no excessive proportion of rosin and a moderate amount of matter insoluble in alcohol; shall be free from makeweights, and shall be suitable for use with moderately hard water for general cleaning and laundry purposes.

Odor shall not be objectionable in the soap as received or in a hot solution of the soap in water. The materials shall not leave an objectionable odor on dishes or other objects after washing with a water solution of the soap and rinsing thoroughly with hot water. If desired, the odor of the material under the above conditions shall conform to the odor of a sample mutually agreed upon by buyer and seller. The mutually agreed upon sample shall be kept in an air-tight, closed container for comparison with samples from deliveries.

Matter volatile at 105° C. shall not exceed 36 per cent. Deliveries which yield more than 36 per cent volatile matter will be rejected without further test. The sum of free alkali, total matter insoluble in alcohol and sodium chloride, shall be not less than 2 per cent nor more than 10 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.5 per cent. Matter insoluble in water shall not exceed 1 per cent. Rosin shall not exceed 25 per cent. The percentage of matter volatile at 105° C. will be computed on the basis of the soap as received, but all other constituents will be calculated on the basis of material containing 34 per cent of volatile matter.

Powdered Laundry Soap (P-S-596)

Powdered soap for laundry use shall be a soap in powdered form made from soda and fats, without rosin, as free as possible from water and all substances other than true soap, of a light uniform color, free from disagreeable odor, and suitable for high-grade laundry work with soft water, when the presence of alkaline salts is objectionable.

Matter volatile at 105° C. shall not exceed 7 per cent. Deliveries which yield more than 7 per cent of matter volatile at 105° C. will be rejected without further test. The sum of free alkali, total matter insoluble in alcohol, and sodium chloride shall not exceed 3 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.5 per cent. Matter insoluble in water shall not exceed 0.4 per cent. Titer of the mixed fatty acids prepared from the soap shall be not less than 39° C. Residue retained on a No. 12 sieve shall not exceed 1.5 per cent. The percentage of matter volatile at 105° C. will be computed on the basis of the soap as received, but all other constituents will be calculated on the basis of material containing 5 per cent of volatile matter.

Soap Powder (P-S-606)

Soap powder shall be a uniform mixture of soap and sodium carbonate in powdered form. It shall be readily soluble in tepid water, shall contain no free caustic alkali or inert filler, and shall be free from objectionable odor.

Anhydrous soap shall be not less than 15 per cent. Sodium carbonate (Na_2CO_3) shall be not less than 30 per cent. The aggregate of anhydrous soap and sodium carbonate shall be not less than 55 per cent.

Salt-Water Soap (P-S-611)

Salt-water soap shall be a soap well made from pure coconut oil, pure palm kernel oil, or a mixture thereof, and the necesary alkali. It shall be entirely soluble in both sea water and fresh water and shall make a suitable lather.

Matter volatile at 105° C. shall not exceed 55 per cent. Deliveries which yield more than 55 per cent of volatile matter will be rejected without further test. Total matter insoluble in alcohol shall be not less than 2 per cent nor more than 3 per cent and shall consist, essentially, of sodium carbonate (Na_2CO_3). Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.5 per cent. Matter insoluble in water shall not exceed 0.5 per cent. Chloride, calculated as sodium chloride (NaCl), shall be not less than 2.5 per cent nor more than 3.5 per cent. Rosin, sugar, and foreign matter shall not be present. The acid number of the mixed fatty acids prepared from the soap shall be not less than 240. The percentage of matter volatile at 105° C. will be

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computed on the basis of the soap as received, but all other constituents will be calculated on the basis of material containing 55 per cent of volatile matter.

Soft Soap for Automobile and General Cleaning (P-S-612)

Soft soap for cleaning automobiles and for general cleaning shall be a uniform translucent, firm gel or paste of a yellowish-white to brownish-yellow color made solely from whole neutral vegetable oils and potash. The odor shall not be objectionable in the soap as received or in a hot solution of the soap in water. The material shall not leave an objectionable odor on surfaces after washing with a water solution of the soap and rinsing thoroughly with plain water.

Moisture shall not exceed 55 per cent. Deliveries which yield more than 55 per cent of moisture shall be rejected without further test. The soap shall dissolve readily to give a 0.15 to 0.2 per cent solution, using distilled water at 15.5 to 20° C. (60° to 68° F.). The solution so prepared shall yield a good suds. The material shall not become rancid or otherwise deteriorate when kept in a closed container. The soap shall conform to the requirements as shown in the accompanying table.

Detail Requirements for Automobile Soap

	Minimum Per Cent	*Maximum Per Cent*
Moisture (xylol distillation method)	—	55
Sum of free alkali and total matter matter insoluble in alcohol	—	1
Chloride, calculated as potassium chloride (KCl)	—	.5
Free alkali, calculated as potassium hydroxide (KOH)	—	.05
Free acid, calculated as oleic acid	—	.1
Matter insoluble in distilled water	—	.2
Unsaponified and unsaponifiable matter	—	.8
Anhydrous soap, calculated as potash soap	43	—
Total sodium compounds, calculated as Na_2O	—	.5
Glycerol	4	—
Iodine number (Wijs) of mixed fatty acids derived from the soap	100	150
Acid number of mixed fatty acids derived from the soap	195	205
Rosin	—	None
Sugar	—	None

Potash Linseed Soap (P-S-613)

Potash-linseed-oil soap shall be a uniform translucent firm gel or paste made solely from whole neutral raw linseed oil and potash. It shall be of a yellowish white to greenish-brown color. Unless otherwise specified, each bidder shall submit with his proposal a 1-quart sample of the soap that he proposes to furnish, packed in a screw-top glass jar, to show odor, color, and consistency. The sample so furnished shall be kept for comparison with samples from deliveries. Moisture shall not exceed 55 per cent. Deliveries which yield more than 55 per cent of moisture shall be rejected without further test. The soap shall dissolve readily to give a 0.15 to 0.2 per cent solution, using distilled water at 10° to 15.5° C. (50° to 60° F.). The solution so prepared shall yield a good suds.

The material shall conform to the detail requirements as shown in the accompanying table. The percentage of moisture shall be computed, and reported by the testing laboratory, on the soap as received. The percentages of all other constituents shall be calculated and reported on an assumed moisture content of 50 per cent.

White Floating Toilet Soap (P-S-616)

White, floating soap shall be a cake soap, at least as good in every respect as one made from soda and a mixture of high-grade tallow with 25 to 30 per cent of coconut oil, of good light color, without objectionable odor, thoroughly saponified, and so prepared as to float on water.

Matter volatile at 105° C. shall not exceed 34 per cent. Deliveries which yield more than 34 per cent volatile matter will be rejected without further test. The sum of free alkali, total matter insoluble in alcohol, and sodium chloride shall not exceed 2.0 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.15 per cent. Chloride, calculated as sodium chloride (NaCl), shall not exceed 1 per cent. Matter insoluble in water shall not exceed 0.2 per cent. Rosin, sugar, and foreign matter shall not be present. The acid number of the mixed fatty acids prepared from the soap shall be not less than 212. The percentage of matter volatile at 105° C. will be computed on the basis of the soap as received, but all other constituents will be calculated on the basis of material containing 28 per cent of volatile matter.

Detail Requirements for Potash Linseed Soap

	Minimum Per Cent	*Maximum Per Cent*
Moisture (xylol distillation method)	—	55
Sum of free alkali and total matter insoluble in alcohol	—	1
Free alkali, calculated as potassium hydroxide (KOH)	—	0.1
Free acid	—	None
Chloride, calculated as potassium chloride (KCl)	—	0.5
Matter insoluble in distilled water	—	0.2
Unsaponified matter	—	2
Anhydrous soap, calculated as potash soap	43	—
Total sodium compounds, calculated as Na_2O	—	0.5
Glycerol	4	—
Iodine number (Wijs) of mixed fatty acids prepared from ths soap	175	—
Rosin	—	None
Sugar	—	None

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Liquid Toilet Soap (P-S-618)

Liquid toilet soap shall be a clear solution of pure vegetable oil potash (or potash and soda) soap with or without glycerol or alcohol, suitably perfumed, and free from all foreign matter. It shall quickly form a satisfactory lather and have no injurious effect and leave no objectionable odor on the skin.

The odor shall not be objectionable in the soap as received or in a hot solution of the soap in water. The material shall not leave any objectionable odor on the skin or other surfaces after washing with a water solution of the soap and rinsing thoroughly with plain water. Unless otherwise specified each bidder shall submit with his proposal a one-quart sample, placed in a screw-top glass jar, to show odor, color, and consistency. The sample so furnished shall be kept for comparison with samples from deliveries.

The material shall be a clear solution, free from objectionable odor, other than from coconut oil, and shall form a satifsactory lather. Total anhydrous soap shall be not less than the equivalent of 15 per cent potash soap. Total matter insoluble in alcohol shall not exceed 0.5 per cent. Free alkali calculated as potassium hydroxide (KOH) shall not exceed 0.05 per cent. Chloride calculated as potassium chloride (KCl) shall not exceed 0.3 per cent. More than traces of sulphates and sugar shall not be present. All constituents shall be calculated on the basis of the original sample.

Milled Toilet Soap (P-S-621)

Milled toilet soap shall be a high grade, milled cake soap as free as possible from water, either colored or uncolored, and mildly perfumed unless otherwise specified, thoroughly saponified, well compressed in firm, smooth cakes of a size and shape specified in the contract. It should lather freely when used with cold, soft, water.

Matter volatile at 105° C. shall not exceed 15 per cent. Deliveries which yield more than 15 per cent of volatile matter will be rejected without further test. The sum of free alkali, total matter insoluble in alcohol, and sodium chloride shall not exceed 1.5 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Matter insoluble in water shall not exceed 0.2 per cent. Unsaponified saponifiable matter shall not exceed 0.3 per cent. Rosin, sugar and foreign matter shall not be present. The percentage of matter volatile at 105° C. will be computed on the basis of the soap as received, but all other constitutents will be calculated on the basis of material containing 15 per cent of matter volatile at 105° C.

Powdered Toilet Soap (for dispensers) (P-S-626)

Powdered toilet soap for use in dispensers shall be a thoroughly saponified soap in powdered form, made from soda and fats; shall be uncolored and mildly perfumed, unless otherwise specified; shall be a uniform, free-flowing, noncaking powder; and shall lather freely when used with cold soft water.

The material shall be a uniform powder and shall be freeflowing and noncaking when used in a dispenser conforming to type III or IV of Federal Specification FF-D-396. It shall lather freely when used with soft water at room temperatures. Shall be mildly perfumed, unless otherwise specified. If desired, shall conform to the odor of a sample mutually agreed upon by buyer and seller. The mutually agreed upon sample shall be kept in an airtight, closed container for comparison with samples from deliveries.

Shall be uncolored, unless otherwise specified. Matter volatile at 105° to 110° C. shall not exceed 6 per cent. Deliveries which yield more than 6 per cent of volatile matter shall be rejected without further test. The sum of free alkali, total matter insoluble in alcohol, and sodium chloride shall not exceed 2.0 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Matter insoluble in water shall not exceed 0.2 per cent. Rosin, sugar, and foreign matter shall not be present. The material shall meet the following fineness requirements:

Retained on—	*Min. Per Cent*	*Max. Per Cent*
No. 12 sieve.....	—	0.5
No. 45 sieve.....	50	—
No. 100 sieve.....	90	—

Caustic Soda for Cleaning (P-S-631a)

Caustic soda shall be of but one grade. It shall be furnished in airtight containers (13-ounce cans or rums) in flake, ground, or lump form, as specified in the invitation for bids. It shall conform to the following detail requirements:

Sodium hydroxide (NaOH) shall be not less than 95 per cent.

Carbonate, calculated as sodium carbonate (Na_2CO_3), shall be not more than 2 per cent.

Laundry Soda (Washing Soda) (P-S-641a)

Laundry soda shall be a white uniform powder composed of sodium carbonate and sodium bicarbonate. It shall conform to the following detail requirements:

	Maximum %	*Minimum %*
Total alkalinity, calculated as Na_2O	43	39
Sodium bicarbonate ($NaHCO_3$)	50	35
Sodium carbonate (Na_2CO_3)	50	35
Sum of sodium carbonate and sodium bicarbonate	—	85
Matter insoluble in water.	.1	—

Mechanics' Hand Detergent (P-D-221)

Detergent for mechanics use shall be of the following types, as specified: Type I—hand grit paste soap; Type II—hand scouring powder. It shall be a uniform mixture in paste or powder form, as specified, and shall be satisfactory for removing oil, grease, paint, printing inks, and other occupational soil from the hands of automobile mechanics, machinists, and other operatives without harmful effect on the skin.

Type I — (Hand grit paste soap).

The material shall be a uniform paste. The odor shall not be

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Pure white, crystalline, immediately and entirely soluble, always free running, Solvay Snowflake Crystals is an excellent water softener and effective soap saver.

Perfect solubility enables this mild cleanser to do its work without leaving a residue. Snowflake Crystals also makes a perfect base for bath salts.

SOLVAY SPECIAL CLEANSERS—mixtures of basic materials used in all general cleansing. Solvay manufactures a complete line of these cleansers, covering every cleansing need which can be filled by the use of milder types of alkali. The Solvay Products book, which describes these products, can be obtained from any office of the Solvay Sales Corporation.

SOLVAY SUPER ALKALIES—Solvay Super Alkalies are specially prepared mixtures of a stronger type than the Special Cleansers. These alkalies are well adapted to the heavy duty type of cleaning.

Full information will be supplied promptly upon request.

SOLVAY DETERGENT—Detergent of a special grade adapted to various kinds of scouring, is another Solvay line which is providing profitable business opportunities in private label trade.

Another field in which Solvay quality enables you to *beat* competition! Full information upon request.

SOLVAY FLUF*—Fluf makes an ideal cleanser to add to your line of repackaging products. It is an extra light soda ash made especially fluffy, bulky and light by a process that is exclusive with Solvay. Its weight per cubic foot is approximately ⅔ that of regular soda ash.

Fluf is particularly valuable where maximum bulk with minimum weight is required, as in repackaging.

SODA ASH—*58% Dense, Light and Extra Light*—Solvay Soda Ash is made of materials selected with the utmost care. It is a product of high purity, controlled in its manufacture by rigid specifications that have been formulated through more than half a century of experience.

CAUSTIC SODA—*Solid • Flake • Liquid • Ground • Powdered*—The high standard of quality which The Solvay Process Company has established in the alkali field is well exemplified in Solvay Caustic Soda—made from soda ash manufactured by the Solvay process.

For the convenience of the consumer, Solvay Caustic Soda is delivered in the five forms listed above.

Where manufacturers are equipped to handle and store the liquid form, handling costs can be proportionately reduced and convenience greatly facilitated. For full information, send for the **SOLVAY BOOK ON LIQUID CAUSTIC SODA**. This latest authoritative publication gives all necessary practical information regarding the unloading and handling of this highly advantageous product.

CAUSTIC POTASH—*Solid • Flake • Liquid*—The same high quality that has earned for Solvay Caustic Potash Liquor a preeminent place in the field is now obtainable in the Flake and Solid forms. Solvay Caustic Potash typifies the excellence which has made Solvay Products the outstanding choice of soap makers everywhere.

SOLVAY PARA-DICHLOROBENZENE
Wide selection of grade sizes in *Fine • Medium • Coarse • Super-Coarse Crystals*—Especially well adapted to block manufacture.

Solvay Para-dichlorobenzene is supplied in many carefully graded crystal forms, insuring perfect blending with colors and perfumes.

A product of exceptional purity. Delivered in a selection of packages wide enough to meet all marketing needs. Write today for prices and full information.

SOLVAY ORTHODICHLOROBENZENE
For making insecticide sprays, metal polishes and grease and tar solvents. It cuts greasy films and dissolves most metallic oxides. A water-white liquor, shipped in 55 gal. drums and 5 gal. cans.

The important ingredient for the termite exterminating solutions.

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YOUR SOURCE OF RAW MATERIALS

FOR

FOR HOUSEHOLD CLEANSERS: Solvay manufactures a complete line of alkali products, from mild to strong alkalies and scouring powders, that may be used as the base in household cleansers for practically every housecleaning requirement.

FOR COMMERCIAL CLEANSERS AND METAL POLISHES: Solvay alkalies, in varying strengths, from straight Soda Ash and Caustic Soda to Snowflake* Crystals, are available to repackers for preparing cleansers for metal and other types of heavy duty industrial cleaning. For cutting grease and making metal polishes, use Solvay Orthodichlorobenzene.

FOR SOAP POWDERS AND SOLUTIONS: Many Solvay alkalies, such as Solvay Fluf* and 58% Light Soda Ash and special cleanser mixtures, are ideally suited for mixing with dry or wet soaps.

FOR BATH CRYSTAL BASE: Solvay Snowflake Crystals—used by many of the country's leading producers of bath crystals—have built up a reputation for their non-caking features and beautiful appearance, ready solubility, and their ability to accept coloring and perfumes. Snowflake Crystals are a mild cleanser. They *soften the water,* DO NOT HARDEN IT!

FOR HOUSEHOLD BLEACHES: Solvay Liquid Chlorine and Caustic Soda are used in making household bleach. The Solvay bleach testing kit—a simple means of determining percentage of available chlorine—is available at cost. Write for more information.

FOR DRAIN PIPE SOLVENTS: Solvay 76% Flake and 76% Ground Caustic Soda, with additions of other materials, are widely used by manufacturers of drain pipe solvents.

FOR DEMOTHING AND DEODORIZING: Solvay Para-dichlorobenzene is widely used as a demothing and deodorizing agent. Solvay Para-dichlorobenzene in 10 different crystal grade sizes is available for all purposes. It may be dyed, perfumed, and poured or pressed into blocks as desired. In crystal form, it makes up attractively in transparent packages.

FOR TERMITE CONTROL: Solvay Orthodichlorobenzene is a recommended product for extermination of termites. It may be sprayed or brushed on timber, or poured into a trench around infected wood. Write for complete information on these and other Solvay products. ➡

Household Cleansers

Commercial Cleansers and Metal Polishes

Soap Powders

Bath Crystals

Household Bleach

Drain Pipe Solvents

Deodorizing Preparations

Moth and Termite Control

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objectionable. If desired, shall conform to the odor of a sample mutually agreed upon by buyer and seller. The mutually agreed upon sample shall be kept in an airtight, closed container for comparison with samples from deliveries. Volatile matter at 105° to 110° C. shall not exceed 55 per cent. Deliveries which yield more than 55 per cent of volatile matter shall be rejected without further test. Alkaline salts, calculated as sodium carbonate (Na_2CO_3), shall not be more than 2 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.02 per cent. Free acid, calculated as oleic acid, shall not exceed 0.2 per cent. Anhydrous soap, calculated as soda soap, shall be not less than 8 per cent nor more than 16 per cent. Insoluble siliceous matter shall be not less than 25 per cent nor more than 50 per cent and shall conform to the following fineness requirements:

Retained on—	*Min. Per Cent*	*Max. Per Cent*
No. 40 sieve.....	—	0
No. 60 sieve.....	10	20
No. 80 sieve.....	30	45
No. 100 sieve.....	35	55
No. 200 sieve.....	60	—

The material shall retain the consistency of a firm paste after keeping in a closed container for 6 hours at 30° to 32° C. (86° to 89.6° F.). The material shall not deteriorate when kept in an airtight container. The percentage of matter volatile at 105° to 110° C. will be computed on the basis of the grit paste soap as received, but all other constituents will be calculated on the basis of material containing 50 per cent of matter volatile at 105° to 110° C.

Type II — (Hand scouring powder).

The material shall be a uniform, free-flowing powder. The odor shall not be objectionable. If desired, shall conform to the odor of a sample mutually agreed upon by buyer and seller. The mutually agreed upon sample shall be kept in an airtight, closed container for comparison with samples from deliveries. Volatile matter at 105° to 110° C. shall not exceed 5 per cent. Deliveries which yield more than 5 per cent of volatile matter shall be rejected without further test. Alkaline salts, calculated as sodium carbonate (Na_2CO_3), shall be not less than 2 per cent nor more than 5 per cent. The alkaline salts shall consist of borax, sodium carbonate or a mixture thereof. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Free acid, calculated as oleic acid, shall not exceed 0.2 per cent. Anhydrous soap, calculated as soda soap, shall be not less than 17 per cent. Insoluble siliceous matter shall be not less than 60 per cent nor more than 76 per cent and shall conform to the following fineness requirements:

Retained on—	*Maximum Per Cent*
No. 60 sieve.....	5
No. 100 sieve.....	30
No. 200 sieve.....	60

Rosin or sugar shall not be present. All constituents shall be reported on the basis of the sample as received.

Special Detergents

Detergents for aluminum-ware shall be of the following types and classes:

Type I. Detergent for use in mechanical dishwashing machines.

Type II. Detergent for manual cleaning.

Class A. Non-abrasive cleaner.

Class B. Abrasive cleaner.

The material used in Type I detergent shall be suitable for use in mechanical dishwashing machines and shall be substantially uniform in appearance throughout. It shall be free from objectionable odor, and shall dissolve readily in tepid water. Cleaner may be supplied in either powder, granule, chip, or liquid form provided it conforms to the detailed requirements.

The material used in Type II, Class A non-abrasive cleaner shall be suitable for any type of manual washing where abrasiveness is not desired, and shall be substantially uniform in appearance throughout. It shall be free from objectionable odor, and shall dissolve readily in tepid water. Cleaner may be supplied in either powder, granule, chip, or liquid form provided it conforms to the detailed requirements.

The material used in Class B abrasive cleaner shall be suitable for any uses requiring a manual cleaner where soil adheres too tenaciously for non-abrasive cleaners. It may be supplied in the form of a liquid, a solid, a paste, or a combination of any two of the above. Combinations of metal wools and soaps may be supplied. The cleaner shall be free from objectionable odor and from poisonous or irritant chemicals.

Each bidder shall submit with his proposal for Type I and Type II, Class A, materials a sample of the material that he proposes to furnish. Each sample shall be labeled to show the amount recommended for softening 10 gallons of water containing 10 grains (171 p.p.m.) of hardness, calculated as $CaCO_3$, and may be used by the inspector or purchasing officer in the recommended proportions for determining the performance or cleaning ability of the material.

Samples from deliveries shall be subjected to similar tests. If specified by the purchasing officer, the material, when used in the proportions recommended by the bidder, shall be at least equal in cleaning ability to a standard sample furnished, or indicated, by the purchasing officer.

Type I. Detergent for use in mechanical dishwashing machines shall conform to the following detail requirements: *Turbidity* — When tested by the method described in paragraph F-2b (1), (See complete specifications) the weight of the precipitate obtained shall be less than 20 mg for 250 ml of solution. *Foaming* — When tested by the method described in paragraph F-2c, no foam or suds shall be detected. *Corrosion* —When tested by the method described in paragraph F-2f (1), the detergent solution shall be without visible action on bare or anodic oxide- coated aluminum alloy. *Water-Softening Capacity*—A suds which is stable for not less than 5 minutes

shall be formed when the material is tested as described in paragraph F-2d. *Hydrogen Ion Content and Buffer Index*—When tested by the method outlined in paragraph F-2g, the detergent solution shall have an initial pH of not less than 10.0, and shall have a pH of not less than 9.0 after the addition of the specified amount of hydrochloric acid solution. *Cleaning Ability.*—The material shall clean satisfactorily when tested as indicated in paragraph F-2a. The relative cost of the detergent shall be determined from the product of the delivered price per pound of the detergent and the number of pounds of the detergent required to treat 1000 gallons of water containing 10 grains (171 p.p.m.) per gallon of hardness, calculated as $CaCO_3$. The amount of detergent used in this computation shall be that required to give the concentration used in paragraphs F-2b (1) and F-2d of this specification.

Type II, Class A. Non-Abrasive Cleaner shall conform to the following detail requirements:

Turbidity—The turbidity of the cleaner solution shall conform to the test described in paragraph F-2b (2). (See complete Specification.) *Corrosion*—When tested by the method described in paragraph F-2f (2), the cleaner solution shall be without visible action on bare or anodic oxide-coated aluminum alloy. *Water-Softening Capacity and Soap*—A suds which is stable for not less than 5 minutes shall be formed when the material is tested as described in paragraph F-2e. *Hydrogen Ion Content*—The pH of a 1 per cent solution by weight of the cleaner in distilled water shall not exceed 10.5 when measured as indicated in paragraph F-2h. *Cleaning Ability.*—The material shall clean satisfactorily when tested as indicated in paragraph F-2a. *Relative Cost*—The relative cost of the cleaner shall be determined from the product of the delivered price per pound of the cleaner and the number of pounds of the cleaner required to treat 1000 gallons of water containing 10 grains (171 p.p.m.) per gallon of hardness, calculated as $CaCO_3$. The amount of cleaner used in this computation shall be that required to give the concentration used in paragraphs F-2b (2) and F-2e of this specification.

Type II, Class B. Abrasive Cleaner shall conform to the following detail requirements: *Abrasion*—When tested by the method described in paragraph F-2i (See complete Specification) the cleaner shall produce no undesirable scratching. *Corrosion*—When tested by the method described in paragraph F-2f (3), the cleaner shall be without visible action on bare or anodic oxide-coated aluminum alloy. *Rinsibility*—When tested by the method described in paragraph F-2j, the cleaner shall be removed completely from a glass plate. *Cleaning Ability*—The material shall clean satisfactorily when tested as indicated in paragraph F-2a.

Sweeping Compound (P-C-591)

Sweeping compound shall consist of a uniform mixture of the materials as specified for each type and shall be artificially colored or uncolored as specified by the purchaser. If desired, shall conform to the color of a sample mutually agreed upon by buyer and seller.

Type I — (Mineral-oil compound).

Odor shall not be objectionable. If desired shall conform to the odor of a sample mutually agreed upon by buyer and seller. The mutually agreed upon sample shall be kept in an airtight, closed container for comparison with samples from deliveries. The material shall, on use, not stain flooring or adjacent surfaces. The material shall not give off flammable vapors when tested according to section F-2b. Material not meeting the test for flammable vapors will be rejected without further test. Water (matter volatile at 105-110° C.) shall be not more than 10 per cent by weight. Refined mineral oil (such as paraffin oil) shall be not less than 15 per cent and not more than 20 per cent by weight. Clean, fine, sharp sand or feldspar sand shall be not less than 35 per cent and not more than 50 per cent by weight. Not more than 1 per cent of sand shall be retained on a No. 20 sieve when tested according to section F-2j. Fatty oils shall not be present. The remainder shall be finely ground sawdust. Not more than 1 per cent of sawdust shall be retained on a No. 8 sieve when tested according to section F-2j.

Type II — (Water-wax-emulsion compound).

Odor shall not be objectionable. If desired shall conform to the odor of a sample mutually agreed upon by buyer and seller. The mutually agreed upon sample shall be kept in an airtight, closed container for comparison with samples from deliveries. The material shall not stain flooring surfaces on which it may be used. The material shall not give off flammable vapors when tested according to section F-2b. Material not meeting the test for flammable vapors will be rejected without further test. Water (matter volatile at 105-110° C.) shall be not more than 12 per cent by weight. Clean, fine, sharp sand, or feldspar sand shall be not less than 60 per cent and not more than 70 per cent by weight. Not more than 1 per cent of sand shall be retained on a No. 20 sieve when tested according to section F-2j. Finely ground sawdust shall be not less than 5 per cent and not more than 10 per cent by weight. Not more than 1 per cent of sawdust shall be retained on a No. 8 sieve when tested according to section F-2j. The remainder shall be waxes and emulsifying agents.

Metal Polish (P-P-556a)

Metal polish shall be of the following types:

Type I. Powder.
Type II. Liquid.
Type III. Paste.

Metal polish of each type shall be of but one grade. It shall be a product, with or without a finely divided abrasive, suitable for the removal of tarnish from brass, nickel, copper, and other metals and capable of producing a luster thereon.

All types shall give good protection to the polished surface against tarnishing influences, and shall be so constituted and prepared that, by reason of application and polishing, they—

(1) Shall not scratch metals.

(2) Shall not leave the metal discolored or caked with abrasive material.

(3) Shall not be detrimental in any manner to metals.

(4) Shall not show any unnecessary caking of type I or III polish in the containers. The abrasive material in liquid (Type II) polish, shall show no caking in the container, which cannot be readily put into suspension by thoroughly shaking the containers. The abrasive material shall be of such particle size that 100 per cent will pass through a No. 200 sieve.

Metal polish shall be free from acids, cyanide of potassium or other cyanides, grit, or other ingredients having detrimental effects on metals. Shall clean quickly, leaving a bright polished surface, with a full luster for the material being polished. When so specified the tarnish-removing and luster-producing properties shall be equal in quality to those of a standard sample furnished or approved by the purchaser. The polished surface shall remain free from corrosion or discoloration for a period of at least 24 hours.

Polish shall have good keeping qualities and be guaranteed for 1 year from the date of actual receipt at point of delivery. During the guaranty period the successful bidder shall replace without cost any metal polish which through deterioration, evaporation, caking in the container, or other causes, becomes unfit for use. Replacement metal polish shall also be guaranteed for 1 year from date of receipt. The metal polish will be stored in original, unopened shipping containers, not subjected to freezing temperature or to excessive artificial heat. The amount of volatile matter, at 105° to 107° C., in either type II or III polish, shall not exceed 70 per cent by weight, of the polish. The flammability of the liquid contents of types II and III polishes shall be not less than 39° C.

Silver Polish (P-P-571b)

Silver polish shall be of the following types:

Type I. Liquid.

Type II. Paste.

Type III. Powder.

Silver polish shall be of but one grade, and shall consist solely of finely ground diatomaceous or infusorial earth, prepared as a powder (Type III) or suitably compounded with a neutral soap, to produce a liquid (Type I) or a paste (Type II).

All types of silver polish shall have—

(a) Good tarnish-removing properties.

(b) Good luster-producing properties and shall be so constituted and prepared that by reason of application and polishing, they—

(1) Shall not scratch silverware.

(2) Shall not leave silver discolored.

(3) Shall not leave any residue (which will cause discoloration) not removable by washing in warm soapy water.

(4) Shall not show any unnecessary caking of Type II or III polish in the containers. The abrasive material in liquid (Type I) polish, shall show no caking in the container which cannot be readily put into suspension by thoroughly shaking the containers.

The diatomaceous or infusorial earth in all types of silver polish shall be of such particle size that 100 per cent will pass through a No. 200 sieve.

Silver polish shall be free from acids or cyanides. Shall clean quickly leaving a bright polished surface, with a full luster for the material being polished. It shall have good keeping qualities and be guaranteed for 1 year from the date of actual receipt at point of delivery. During the guaranty period the successful bidder shall replace, without cost any silver polish which through deterioration, evaporation, caking in the container or other causes, becomes unfit for use. Replacement silver polish shall also be guaranteed for 1 year from date of receipt. The silver polish will be stored in original unopened shipping containers not subjected to freezing temperature or to excessive artificial heat. The amount of volatile matter, at 105° to 107° C., in either Type I or II polish, shall not exceed 70 per cent by weight, of the polish. The flammability of the liquid contents of Types I and II polishes shall be not less than 39° C.

Stove Polish (P-P-576)

Stove polish shall produce a deep, lustrous black color when applied as directed by the manufacturer. It shall produce no odors upon burning and shall produce a durable coating that will not readily be burned off.

Type I.—Polish, stove, liquid, shall be of such consistency that the addition of a fluid will not be necessary in order to make it free-flowing. The vehicle of the polish shall be a non-inflammable liquid.

Type II.—Polish, stove, paste, shall be non-inflammable and shall be of such consistency that it can be readily applied.

Type III.—Polish, stove, powder, shall readily form a paste with water, and shall be non-inflammable.

Type IV.—Polish, stove, cake, shall readily disintegrate in water and form a paste and shall be non-inflammable.

Scouring Powder for Floors (P-P-591)

Scouring powder for floors shall be of the following types, as specified: Type A—for fine marble floors; Type B—for tile or ceramic and terrazzo floors; Type C—soap scouring compound.

Type A—(For fine marble floors).

Matter volatile at 105° to 110° C. shall not exceed 10 per cent. Deliveries which yield more than 10 per cent of volatile matter shall be rejected without further test. The sum of sodium carbonate (Na_2CO_3) and anhydrous soap shall not exceed 7 per cent nor be less than 2 per cent.

Free alkali, calculated as sodium hydroxide (NaOH) shall not exceed 0.1 per cent. Insoluble siliceous material shall be not less than 85 per cent nor more than 95 per cent. All of the insoluble siliceous material shall pass through a No. 100 sieve, and the residue retained on a No. 200 sieve shall not exceed 5 per cent. The material shall not scratch nor discolor marble. The material shall be a uniform powder, shall be unscented, and shall be of a light gray or white color.

Type B—(For tile or ceramic and terrazzo floors).

Matter volatile at 105° to 110° C. shall not exceed 10 per cent. Deliveries which yield more than 10 per cent of volatile matter shall be rejected without further test. The sum of sodium carbonate (Na_2CO_3) and anhydrous soap shall not be less than 2 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Insoluble siliceous material shall be not less than 80 per cent nor more than 95 per cent. The insoluble siliceous material shall not yield more than 1 per cent of residue retained on a No. 60 sieve and not more than 10 per cent of residue retained on a No. 80 sieve. The material shall be a uniform powder, shall be unscented, and shall be of a light-gray or white color.

Type C—(Soap scouring compound).

Matter volatile at 105° to 110° C. shall not exceed 6 per cent. Deliveries which yield more than 6 per cent of volatile matter shall be rejected without further test. Carbonated alkali, calculated as sodium carbonate (Na_2CO_3) shall not be less than 6 per cent nor more than 20 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Anhydrous soap shall be not less than 3 per cent nor more than 10 per cent. Insoluble siliceous material shall be not less than 60 per cent nor more than 90 per cent. The insoluble siliceous material shall not yield more than 1 per cent of residue retained on a No. 60 sieve and not more than 10 per cent of residue retained on a No. 80 sieve. The material shall be a uniform powder, shall be unscented, and shall be light-gray or white in color.

Scouring Powder for Glass (P-P-596)

Shall be a fine, uniform powder, and shall be suitable for cleaning highly polished glass surfaces which must transmit light efficiently, such as cabin windows and windshields of aircraft.

The material shall clean glass surfaces satisfactorily without scratching the glass or leaving an oily or other film on the surface. The material shall be a uniform, free-flowing powder, shall be scented or unscented, and shall be white or light gray in color. Matter volatile at 105° to 110° C. shall not exceed 4 per cent. Deliveries which yield more than 4 per cent of volatile matter shall be rejected without further test. Alkali as alkaline salts (total alkalinity of matter insoluble in alcohol), calculated as sodium carbonate (Na_2CO_3), shall not exceed 5 per cent. Free alkali, calculated as sodium hydroxide (NaOH), shall not exceed 0.1 per cent. Insoluble siliceous material shall be not less than 85 per cent nor more than 93 per cent, and shall consist of ground feldspar or other insoluble siliceous abrasive that will not scratch highly polished glass surfaces. All of the insoluble siliceous material shall pass through a No. 100 sieve, and the residue retained on a No. 200 sieve shall not exceed 5 per cent. Rosin, sugar, and foreign matter shall not be present. Anhydrous soda soap shall be not less than 4 per cent and shall be within 1 per cent of the difference between 100 and the sum of the matter volatile at 105° to 110° C., insoluble siliceous material. and alkali as alkaline salts.

Technical Trisodium Phosphate (O-T-671a)

Technical trisodium phosphate shall be a white, uniform product and may be either granular, flake, or crystalline.

It shall contain not less than 98 per cent of trisodium phosphate calculated as $Na_3PO_4.12H_2O$, from the total phosphoric anhydride (P_2O_5). It shall conform to the following detail requirements:

	Minimum %	*Maximum %*
Trisodium phosphate, calculated as $Na_3PO_4.12H_2O$, from total P_2O_5	98	—
Total alkalinity to methyl orange, calculated as Na_2O	16	19
Phosphoric anhydride (P_2O_5)	18.3	—
Matter insoluble in water	—	0.1

Sodium Fluoride (O-S-601)

Sodium fluoride shall be a good grade commercial product in the form of a uniform, fine, dry, powder, suitable for dusting, free from lumps or gritty material and practically free from matter insoluble in water. It shall contain not less than 90 per cent of sodium fluoride, NaF, the remaining 10 per cent to consist of the usual impurities in a good grade of commercial sodium fluoride, such as sodium silico-fluoride, sodium bifluoride, sodium carbonate, sodium chloride, sodium sulfate and added dye. It shall be colored by incorporating with it a suitable organic dye to produce a color ranging from "Pale Nile Blue" to "Nile Blue" as designated by Ridgeway's Color Standards.

Soda Ash (O-S-571a)

Soda ash shall be of the following types, as specified:

Type I. 58% ordinary or light.

Type II. 58% extra-light.

Type III. 58% dense.

Soda ash shall be a high-grade anhydrous sodium carbonate in powdered form and shall be of the type specified by the purchaser. It shall conform to the following detail requirements for each type as indicated:

Chemical composition — Soda ash, Types I, II, and III, after drying for 1 hour at 150° to 155° C. shall conform to the following requirements as to chemical composition:

	Per Cent
Total alkalinity, calculated as Na_2CO_3, minimum	99.2
Sodium bicarbonate ($NaHCO_3$), maximum	.5
Matter insoluble in water, maximum	.25

Loss in Weight at 150° to 155° C.—The loss in weight on heating about 2g, accurately weighed, of the material (Types I, II, or III) as received for 1 hour at 150° to 155° C. shall not exceed the following limits:

	Per Cent
(a) If sample is taken at manufacturer's works, maximum.....	1
(b) If sample is taken elsewhere, maximum	4

Volume—Thirty grams of the soda ash as received shall have an apparent volume in milliliters for each type indicated, as follows:

	Minimum	Maximum
Type I, light	50 ml.	65 ml.
Type II, extra-light ..	75	95
Type III, dense	25	35

Insect Powder (O-P-571)

Insect powder shall consist of the powdered flower heads of Chrysanthemum (Pyrethrum) cinerariaefolium (Trev. Bocc.). It shall be a product resulting from the reduction to an impalpable powder of insect flower heads of the species named and free from added stems and other adulterants. It shall be made of flowers that have been properly harvested and cured so as to retain the maximum insecticidal efficiency and are free from mold, and the powder shall have the characteristic color and odor. It shall not contain insect flower stems in excess of the amount occurring attached to flowers as harvested, and in no case in excess of 5 per cent. It shall not contain more than 2 per cent of ash insoluble in dilute hydrochloric acid.

Floor Wax (P-W-141)

Floor wax, when applied in accordance with the manufacturer's directions, shall dry to a film that polishes easily to a hard flexible surface of a soft wax sheen. It shall not be so highly colored as to stain the surface; and shall dry within 20 minutes to a semitransparent nontacky film which shall show no signs of whiteness. Floor wax shall consist essentially of blended waxes in a volatile solvent. It shall be free from oil, soap, or rosin.

Type I (liquid)—Shall be a heavy bodied liquid mixture of sufficient fluidity to permit freedom of application at 20° to 25° C. There shall be no appreciable settling of the suspended material. The liquid floor wax shall be smooth and shall be free from all lumpy particles and granules. There shall be not less than 11 per cent, by weight, of nonvolatile matter in the liquid floor wax. The nonvolatile material shall meet the following requirements.

	Min.	Max.
Softening point	71°C.	—
Acid value	—	8
Saponification value ...	20	70
Ash content, per cent..	—	0.5

The liquid vehicle shall consist of volatile solvents, such as turpentine, volatile mineral spirits, etc. The flash point of the volatile solvent shall be not less than 28° C. (closed cup).

Type II (paste).—Shall be a semi-solid material at 20° to 25° C. There shall be no separation of liquid from paste. The paste shall be perfectly smooth and shall be free from lumpy particles and granules. There shall be not less than 20 per cent, by weight, of nonvolatile matter in the paste floor wax. The nonvolatile material shall meet the following requirements:

	Min.	Max.
Softening point	71°C.	—
Acid value	—	8
Saponification value ...	20	70
Ash content, per cent..	—	0.5

The liquid vehicle shall consist of volatile solvents, such as turpentine, volatile mineral spirits, etc. The flash point of the volatile solvent shall be not less than 28° C. (closed cup).

Water Emulsion Floor Wax (P-W-151)

Floor Water-Emulsion Wax shall be furnished in two types and in one grade. Type I.—Regular. Type II.—Concentrated.

The floor water-emulsion wax, when applied in accordance with the manufacturer's directions, shall dry to a lustrous finish without rubbing, buffing, or polishing. The film produced shall adhere firmly to the surface without checking, cracking, or peeling and shall be transparent and practically colorless. The floor water-emulsion wax shall be suitable for use on sealed floors and floorings. It shall have no objectionable odor. It shall be a stable aqueous colloidal emulsion of waxes and resins. The emulsion shall be a free-flowing fluid that can readily be applied with an applicator such as lamb's wool, cotton cloth, or a mop to spread easily and homogeneously. The film so applied shall dry to a lustrous finish.

Water-emulsion floor wax shall meet the following requirements:

Type I.—Regular.

Nonvolatile matter (total solids).—Shall be not less than 12 per cent.

Softening point of solids.—Shall be not less than 80° C.

Ash content (based on nonvolatile matter content).—Shall not exceed 3.0 per cent.

Free caustic alkali—None.

Volatile solvents.—Shall be free from petroleum distillates and other organic volatile solvents

Water solubility.—Shall be not more than 15 per cent.

Dilution properties.—Shall be capable of dilution in any proportion with distilled water without breaking the emulsion.

Type II.—Concentrated.

Nonvolatile matter (total solids).—Shall be not less than 20 per cent. Other characteristics same as above.

Wood Floor Sealer (TT-S-176)

Floor sealer shall be furnished in one type and in one grade for use on wood floors. The manufacturer is given wide latitude in the selection of raw materials and processes of manufacture, provided that the sealer produced meets the requirements and tests described in this specification.

When applied in accordance with directions the product shall satisfactorily seal the pores of the wood by absorption leaving no surface film. The wood surface shall be left in such condition as to provide a satisfactory foundation for a finishing material such as varnish, wax, or water-emulsion wax. Unless other-

wise specified, floor sealer shall be furnished "natural" in color. Floor sealer shall have sufficient fluidity to permit application with a bristle brush or lamb's wool mop.

The floor sealer shall be a non-pigmented material which shall be capable of being thinned with turpentine or mineral spirits. The floor sealer shall meet the following requirements: *Nonvolatile matter*—Not less than 40 per cent. *Set to touch*—In not less than 1 hour and not more than 3 hours. *Dry hard and tough*—In not more than 18 hours.

Water test—The sealer shall meet cold water and boiling water immersion tests as follows:

Flow the sealer on two tin panels and allow to dry for 48 hours. (See Specification for method.) Place one of these panels in a beaker containing about 2.5 inches of distilled water at room temperature (immersing the end of the panel which was uppermost during the drying period) and leave in water for 24 hours. After removing the panel from the water and allowing to dry for 2 hours, the sealer shall show no whitening and no more than very slight dulling. Place the other panel in a beaker containing about 2.5 inches of boiling water (immersing the end of the panel which was uppermost during the drying period) and leave in the boiling water for 30 minutes. After removing the panel from the water and allowing to dry for 2 hours, the sealer shall show no whitening and no more than a very slight dulling.

Toughness—Shall pass a 50 per cent Kauri reduction test at 25° C. (77° F.).

Flash point—Shall be not below 30° C. (86° F.). (Closed-cup.)

Viscosity at 25° C.—Not more than 0.50 poise.

Skinning—Shall be negligible when received and after 48 hours in a tightly closed half-filled container.

Odor—The odor in the can, during drying, and/or after drying shall not be abnormally offensive or disagreeable.

Performance — Floor sealer shall meet performance tests as follows:

Apply the sealer to a properly sanded (with a No. 00 garnet paper) maple wood panel, with a pad of clean cheesecloth, applying a fairly liberal coat. Note fluidity and ease of application. Permit the sealer to set 15 minutes for absorption into the surface of the wood. Wipe off the excess sealer remaining on the surface using a pad of clean cheesecloth (the excess sealer removed in this manner shall be wiped readily and cleanly from the surface). Leave the surface free from all excess sealer. Let dry for 24 hours at a temperature between 21° to 32° C. Then apply a second coat of sealer in accordance with the procedure indicated above. Let dry for 24 hours. The treated panel shall meet the following requirements:

Surface finish—The panel shall show no surface film and the treated surface of the panel shall have a soft, even sheen. The sealer shall not cloud or obscure the grain of the wood.

Resistance to stain—Place several drops of blue-black writing ink (ink to be in accordance with Federal Specification TT-I-563) on the surface of the treated panel at various places and allow to remain for 3 minutes. After taking up the ink with a piece of blotting paper and the spots wiped lightly with a damp cloth, there shall be no indication of the presence of ink.

Treatment of worn spots—Simulate on the treated panel worn areas by rubbing the surface with No. 0 steel wool. Over these areas apply a thin coat of the sealer. Burnish these areas immediately after application of the sealer with No. 00 steel wool. When dry, the treated area shall blend with the surface of the panel without showing any signs of lap marks.

Application of finishing materials—Two treated panels shall be treated; one with floor wax (meeting Federal Specification P-W-141) and the other with water-emulsion floor wax (meeting Federal Specification P-W-151). The properties of the finishing materials shall not be adversely affected by the sealed surface.

Shaving Cream and Soap (FFF-C-641)

Shaving soap and cream shall be of the following types and classes:

Type I. Soap:
- Class (A)—Cakes.
- Class (B)—Stick.
- Class (C)—Powder.

Type II. Cream:
- Class (A)—Lather cream.
- Class (B)—Brushless cream.

Shaving soaps, Type I, shall be high-grade products free of caustic alkalinity that yield a heavy, creamy lather that will remain moist upon the face until the shaving is completed. In the case of Class B (stick), the soap shall adhere to the face when the stick is moistened and rubbed thereon. In the case of class C (powder), the material shall be free-flowing and shall not cake in the container.

Shaving cream—Class A, shall be a soft, uniform cream or paste free from free alkali. It shall be of such consistency that it will not flow from the tube without pressure, not require undue pressure to extrude it, and not lose its form when extruded from the tube. It shall distribute well into the bristles of a shaving brush and shall yield a heavy, creamy lather that will remain moist upon the face until the shaving is completed.

Brushless cream—Class B shall be a soft, uniform cream or paste free from free alkali. It shall remain soft in the tube and shall spread easily.

Type I. Shaving soap, Classes A, B, and C—

Color—shall be as specified by the purchaser. *Odor*—shall be pleasant and shall be as specified by the purchaser. *Lathering quality*—shall be satisfactory. Shall conform to the following test:

Shake 100 ml of a 0.2 per cent (based on the nonvolatile matter) solution of the soap (Type I, classes, A, B, and C and Type II, class A) in distilled water at room temperature in a stoppered, 200-ml graduated cylinder 30 times in 15 seconds, and let stand at room temperature for 1 hour. The volume of foam above the liquid shall extend to the top of the cylinder and shall not decrease more than 10 per cent of its original volume in 1 hour.

Caking (Class C only)—The material shall be free-flowing and shall not cake in a closed container at room temperature.

Type II. Shaving cream, Classes A and B—

Color—shall be as specified by the purchaser. *Odor*—shall be pleasant and shall be as specified by the purchaser. *Consistency*—shall be as stated above. When the packed tubes are kept at a temperature of 32° C. (90° F.) for 24 hours and then at a temperature of 15° C. (59° F.) for 24 hours, the material at the end of each 24-hour period shall on the application of slight pressure extrude from the tube as a smooth mass without any notable change in consistency and without any hardening or separation of the ingredients.

The containers shall be the usual collapsible tube type having rustproof caps for Class A, or collapsible tubes or jars for Class B. The container including the cap shall not be attacked, chemically, by the

shaving cream. There shall be no discoloration of the shaving cream in storage and the tubes shall be constructed in such manner as will prevent the closed end from opening when pressure is applied to extrude the cream for use. Shaving cream that becomes discolored or that chemically attacks containers or caps while in storage during a period of 18 months after delivery shall be replaced without cost. *Lathering quality (Class A only)*—shall be satisfactory. Shall conform to the test described above.

Type I. Shaving soap, Classes A, B, and C—shall conform to the following detail requirements:

TYPE I	Classes A and B cake and stick		Class C powder	
	Min.	Max.	Min.	Max.
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*
Matter volatile at 105° C	—	10	—	2
Matter insoluble in hot 95 per cent ethyl alcohol	—	.8	—	.8
Free alkali	—	None	—	None
Free fatty acids (calculated as stearic acid)	—	1.0	—	1.0
Matter insoluble in hot distilled water	—	.4	—	.4
Anhydrous soap (calculated as potash soap)	87	—	96	—
Amount passing a No. 20 sieve	—	—	100	—

The percentage of volatile matter shall be computed, and reported on the soap as received. The percentages of all other constituents shall be calculated and reported on an assumed volatile matter content of 10 per cent for Classes A and B, and of 2 per cent for Class C.

Type II. Shaving cream, Classes A and B—shall conform to the following detail requirements:

TYPE II	Class A lather cream		Class B brushless cream	
	Min.	Max.	Min.	Max.
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*
Moisture (xylol distillation method)	—	50	—	70
Matter insoluble in hot 95 per cent ethyl alcohol	—	.3	—	—
Free alkali	—	None	—	None
Free fatty acid (calculated as stearic acid)	—	6.5	15	—
Matter insoluble in hot distilled water	—	.3	—	—
Anhydrous soap (calculated as potash soap)	40	—	—	—

The percentage of moisture shall be computed, and reported on the shaving cream as received. The percentages of all other constituents shall be calculated and reported on an assumed moisture content of 50 per cent for Class A, and 70 per cent for Class B.

Publications of the Department of Commerce National Bureau of Standards Washington, D. C. ON DETERGENTS and RELATED SUBJECTS

THE publications for which prices are indicated may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. Single copies of Letter Circulars (having LC numbers) can be secured from the Bureau of Standards, Washington, D. C., without charge.

T-347 Effect of Laundering upon the Thermal Insulating Value of Cotton Blankets (1927). Philip Rudnick 5c

A study of the effect of laundering upon cotton blankets. Washing was found to cause small losses in thermal resistance, which were almost completely restored by the subsequent process which raised the nap on the laundered fabric. The results indicate the importance of a process for restoring the nap after washing.

T-350 A Study of Problems Relating to the Maintenance of Interior Marble (1927). D. W. Kessler.....35c

This paper describes the results of research at the Bureau of Standards in cooperation with the National Association of Marble Dealers. The work describes the ultimate effects on marble due to an extended period of cleaning with various detergents. Several practical methods for removing the more common types of stains occurring on interior marble work are detailed. Methods of treating marble before installation under severe or unusual conditions are considered.

C-70 Materials for the Household 50c

Describes the more common materials used by the household, comprising paints, cement, roofing, inks and dyes, adhesives, cleaners and preservatives, etc. Each title is treated under the general heads of composition and definition, sources, properties, uses, tests, preservation, hints as to selection and use, and references.

C-424 Washing, Cleaning and Polishing Materials....15c

Discusses briefly the chemistry of soap making, describes the various types of soap products in common use, and outlines some of the manufacturing processes. This circular also briefly discusses the use of water in laundering, cleansing action, alkaline cleansers, bleaches, laundry sours, bluing, starch, dry cleaning, polishes, etc.

Letter Circulars

LC 124—Recommended Specification for Powdered Ammonia.

LC 242—Anti-Dimming Preparations for Glass Surfaces.

LC 275—Polishes.

LC 338—Detergents and Certain Detergent Aids.

LC 339—Floor Oils.

LC 340—Sweeping Compounds (also known as "Floor Sweep" and "Dust Down").

LC 341—Drainpipe Cleaners or Solvents.

LC 388—The Care of Floors.

Soap Buying Habits

A study of soap preferences in the Milwaukee market for 1940

SOAP buying habits in the Milwaukee market are checked annually by the *Milwaukee Journal*. Reflecting as they do the buying policies of a representative cross-section of the American public, they give some idea of the national urban market for soaps and allied products. The following figures, taken from the 1940 survey, give the percentage of families in the district using each product, the average consumption where the product is used, and the brands preferred by the largest percentage of Milwaukee residents.

Toilet Soap for Hands and Face

used by 99.2% of reporting families. Leading sellers:

"Lux" 26.0%
"Palmolive" 21.0%
"Ivory" 14.8%

Toilet Soap for Bath

used by 99.2% of reporting families. Leading sellers:

"Lifebuoy" 30.8%
"Ivory" 19.5%
"Lux" 17.4%

Granulated Soap and Soap Beads

used by 78.7% of reporting families. Leading sellers:

"Rinso" 48.3%
"Oxydol" 45.5%
"Super Suds" 20.4%

Tooth Paste

used by 59.2% of reporting families average consumption—2 tubes per month. Leading sellers:

"Colgate's" 25.6%
"Pepsodent" 19.0%
"Ipana" 14.7%

Shaving Cream

used by 42.9% of reporting families average consumption—6.4 tubes or jars per year per man. Leading sellers:

"Palmolive" 37.0%
"Lifebuoy" 23.2%
"Williams" 12.8%

Tooth Powder

used by 52.4% of reporting families average consumption—1.4 cans per month. Leading sellers:

"Dr. Lyon's" 59.5%
"Colgate's" 8.1%
"Pepsodent" 7.5%

Brushless Shaving Cream

used by 20.6% of reporting families average consumption—6.6 tubes or jars per year per man. Leading sellers:

"Barbasol" 21.1%
'Burma Shave" ... 18.6%
"Molle" 17.1%

Mouth Wash

used by 57.8% of reporting families average consumption—1.2 bottles per month. Leading sellers:

"Listerine" 50.0%
"Lavoris" 13.6%
"Thymo-Borine" .. 9.9%

Window Cleaners

used by 28.2% of reporting families, average consumption—3.6 cans or bottles per year. Leading sellers:

"Windex" 71.2%
"Aero-Mist" 10.3%

Bleaching Fluid

used by 70.2% of reporting families average consumption—1.2 bottles per month. Leading sellers:

"Hilex" 35.3%
"Mag" 12.3%
"Wonderene" 11.8%

Liquid Shampoos

used by 47.0% of reporting families average consumption—5.5 bottles per year. Leading sellers:

"Drene" 32.7%
"Fitch's" 17.2%
"Watkins" 16.0%

Package Soap Flakes

used by 79.4% of reporting families. Leading sellers:

"Lux" 33.7%
"Hanser's" 23.9%
"Chipso" 17.1%

Scouring Cleansers

used by 86.5% of reporting families. Leading sellers:

"Kitchen Klenzer". 37.0%
"Old Dutch" 23.9%
"Gold Dust" 8.4%

Soap Crystals, Water Softeners

used by 31.8% of reporting families. Leading sellers:

"Climalene" 59.0%
"No Name" 10.2%
"Melo" 3.4%

(*Turn to Page* 188)

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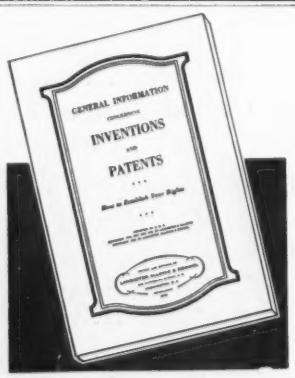

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N.A.I.D.M. SPECIFICATIONS

Official Specifications of the National Association of Insecticide and Disinfectant Manufacturers for

INSECTICIDES and DISINFECTANTS

OFFICIAL SPECIFICATIONS Liquid Household Spray Insecticide

(Adopted December, 1936)

1. A household spray oil type insecticide shall be harmless to man and warm blooded household animals, when used as directed.

2. When sprayed, as directed, it shall not stain fabrics, wall paper and general household furnishings, that are not stained by dry cleaning fluid.

3. When used in the customary manner it shall not contaminate closed packages of food materials commonly found in homes.

4. It shall not corrode metals.

5. It shall have no objectionable odor, and no particular odor shall be specified.

6. It shall have a flashpoint not less than 125° F. when tested in the Tagliabue closed cup.

7. It is recommended that it be purchased on a direct competitive basis with the Official Test Insecticide of the National Association of Insecticide and Disinfectant Manufacturers, Inc., by using the method of test specified on the bottles of the Official Test Insecticide.

8. The Association hereby adopts the following grades (the plus or minus figures shown therein designating the points over or under the Official Test Control Insecticide when the "Unknown" and the "Control" are tested at the same time in the same manner):

Designation	*Grade*	*Kill Classification*
AA	Excellent	+ 16 or higher
A	Very Good	+ 6 to + 15
B	Equal to Official Test Insecticide	+ 5 to — 5

• •

1: Standard Specifications for Liquid Hypochlorites Disinfectant, Deodorant and Germicide

Composition—Liquid hypochlorites are available in three forms: *one,* sodium hypochlorite alkaline with sodium hydrate, sodium carbonate or the other alkaline salts; *two,* hypochlorites which are essentially sodium hypochlorite and alkaline with calcium hydrate; and *three,* calcium hypochlorite solutions alkaline with calcium hydrate. A delivery of any one of these shall be satisfactory unless otherwise specified.

Physical Requirements — The hypochlorite solution shall be a homogeneous liquid. It shall be miscible with water of zero hardness at 20°C. (68°F.) in all proportions. It shall be ready for dilution when delivered.

Chemical Requirements—The available chlorine content which shall not be less than 2.5 per cent by weight shall be clearly stated on the label. Its rate of deterioration shall not be more than 10 per cent of its original available chlorine content when stored in the orginal container for six months in a cool, dark place at maximum temperature of 68°F. (20°C.).

Identification—Each container shall be marked with the name of the material, the brand (if any) of the material, the name of the manufacturer, net contents therein, and date of manufacture.

Packing—The hypochlorite shall be delivered in standard commercial containers of the size as called for in the schedule. Each container holding one gallon or more shall be stoppered with a closure having vent.

2: Standard Specifications for Pine Oil Disinfectant

1. The product shall be manufactured from pure steam distilled pine oil and emulsifying agent and remain clear and homogeneous under normal and reasonable conditions of storage.

2. It shall contain not less than 60 per cent by weight steam distilled pine oil.

3. It shall contain not more than 10 per cent water.

4. The phenol coefficient shall be determined by the F.D.A. Method of Test against B. typhosus and be clearly stated on the label attached to each shipping container.

5. It shall not contain kerosene or other petroleum distillates.

6. The product shall make a stable emulsion in water of zero hardness at 20°C. (68°F.) when diluted at the rate of 5 per cent. The emulsion shall stand for at least twenty-four hours showing no sign of oil float (unsaponified or clear free oil).

3: Standard Specifications for Emulsifying Type Coal Tar Disinfectant

1. It shall be made from phenols of coal tar or petroleum origin, or combinations of such phenols with coal tar oils, and an emulsifying agent.

2. It shall contain not less than 65 per cent by weight of phenols and coal tar oils.

3. It shall contain not over 10 per cent of water, by weight.

4. It shall not contain kerosene or any petroleum distillates other than phenols of petroleum origin.

5. The phenol coefficient shall be determined by the Food and Drug Administration Method using B. typhosus as test organism, and shall be clearly stated on the label attached to each shipping container.[1]

6. It shall make milky emulsions with water of zero hardness at 20° C (68° F) when diluted in the ratio of 5 parts of disinfectant to 95 parts of water for disinfectants having phenol coefficients of 10 or under; and in the ratio of 2 parts of disinfectant to 98 parts of water for disinfectants having phenol coefficients of over 10. These emulsions shall show not more than a trace of oily float or sediment when stored for 5 hours at room temperature.

7. It shall remain limpid, showing no sign of naphthalene crystallization down to 0° C in 3 hours.

8. It shall contain less than 5 per cent of benzophenol.

9. The disinfectant, under normal and reasonable conditions of storage, shall remain stable and show no loss of germicidal value.

Certification and Labeling

10. The following form of statement on labels[2], invoices, etc., is recommended:

"The .....Company certifies this phenolic disinfectant (emulsifying type) to conform to all requirements of the standard adopted by the NATIONAL ASSOCIATION OF INSECTICIDE AND DISINFECTANT MANUFACTURERS, INC., and recorded as Commercial Standard CS70-.... by the National Bureau of Standards of the U. S. Department of Commerce.
Phenol coefficient....."

---

[1]This type of disinfectant is available with phenol coefficients ranging from 2 to 30, and higher. Contract buyers should specify the phenol coefficient desired.

[2]When used on labels this statement is in addition to, and not in lieu of, the ingredient statement required by the Insecticide Act of 1910.

4: Standard Specifications for Cresylic Disinfectants

Scope

1. This standard covers materials, physical and chemical properties, and certification of quality of phenolic disinfectant (soluble type), classified under two groups as follows:

(a) Group I—Phenolic disinfectants having phenol coefficients from 1.5 to 5[1].

(b) Group II—Phenolic disinfectants having phenol coefficients above 5.

Detail Requirements (Group I)

2. Group I disinfectants shall be made from cresol or cresylic acid of coal tar or petroleum origin, and a dissolving agent.

3. Group I disinfectants shall contain not less than 50 per cent of cresol or cresylic acid, as determined by the method prescribed in U. S. Pharmacopoeia XI for the assay of cresol in the Saponated Solution of Cresol.

4. Group I disinfectants shall contain not more than 25 per cent by weight of inert ingredients (water plus glycerine, and organic solvents, if any).

5. The phenol coefficient of Group I disinfectants shall be determined by the Food and Drug Administration Method using B. typhosus as the test-organism, and shall be clearly stated on the label attached to each shipping container.

6. Group I disinfectants shall contain less than 5 per cent of benzophenol.

7. Group I disinfectants shall make clear solutions with water of zero hardness at 20° C (68° F) within the concentration range of from 1 to 4 per cent; such solutions, when kept in closed containers, shall remain either practically clear or become only slightly opalescent when allowed to stand for 24 hours at 20° C (68° F) away from direct light.

8. Group I disinfectants shall show no soap separation when cooled down to 0° C and held at this temperature for 3 hours.

Detail Requirements (Group II)

9. Group II disinfectants shall be made from phenols of coal tar or petroleum origin, and a dissolving agent.

10. Group II disinfectants shall contain not less than 50 per cent of phenols[2].

11. Group II disinfectants shall contain not more than 25 per cent by weight of inert ingredients (water plus glycerine and organic solvents, if any).

12. The phenol coefficients of Group II disinfectants shall be determined by the Food and Drug Administration Method using B. typhosus as the test-organism, and shall be clearly stated on the label attached to each shipping container.

13. Group II disinfectants shall contain less than 5 per cent of benzophenol.

14. Group II disinfectants shall make clear solutions with water of zero hardness at 20° C (68° F) at concentrations of 2 per cent or less; such solutions, when kept in closed containers, shall remain either practically clear or become only slightly opalescent when allowed to stand for 24 hours at 20° C (68° F) away from direct light.

15. Group II disinfectants shall show no soap separation when cooled down to 0° C and held at this temperature for 3 hours.

Certification and Labeling

16. The following form of statement on labels[3], invoices, etc., is recommended:

"The .....Company certifies this disinfectant to conform to all requirements for **(Group I)** (Group II) of the standard adopted by the NATIONAL ASSOCIATION OF INSECTICIDE AND DISINFECTANT MANUFACTURERS, INC., and recorded as Commercial Standard CS71-...., by the National Bureau of Standards of the U. S. Department of Commerce.
Phenol Coefficient....."

[1]The disinfectants of Group I fall within the type commonly designated "Cresylic disinfectants."

[2]A satisfactory method of assay of all possible types of disinfectants comprised by Group II is not available, but work on the subject is in progress.

[3]When used on labels, this statement is in addition to, and not in lieu of, the ingredient statement required by the Insecticide Act of 1910.

Milwaukee Market Survey

(*From Page* 185)

White Laundry Soap

used by 66.3% of reporting families. Leading sellers:

"P. & G." 64.5%
"Crystal White" .. 21.4%
"Ivory" 15.9%

Brown Laundry Soap

used by 58.4% of reporting families. Leading sellers:

"Fels Naptha" 81.3%
"O. K." 12.1%
"American Family" 5.7%

Liquid Dentifrices

used by 22.9% of reporting families average consumption—1.5 bottles per month. Leading sellers:

"Teel" 92.8%
"Pepsodent" 4.2%

Floor Finish Specifications

Specifications of Maple Flooring Manufacturers Association for Heavy Duty Finishes For Maple, Beech and Birch Floors

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A. General Requirements

1. The material shall be suitable for application to new Maple, Beech and Birch flooring or to such flooring which has been in service.

2. The presence of waxes will be permitted within the limits of the detailed requirements.

B. Detailed Requirements

1. The material shall not contain more than 1.0 per cent of water unless it is an emulsion of adequate stability in which case the water shall be the dispersed phase.

2. The material shall not contain more than 0.1 per cent of suspended inorganic matter.

3. The flash point of the material shall not be under 100° F.

4. The material shall contain not less than 28 per cent by weight of non-volatile matter.

5. The film formed by the material, when thoroughly dried, shall not be brittle.

6. The film formed by the material, when thoroughly dried, shall be resistant to abrasion.

7. The film formed by the material, when thoroughly dried, shall be resistant to cold water.

8. The material when applied according to the directions of the manufacturer shall not markedly darken the wood.

9. The material when applied according to the directions of the manufacturer and allowed to dry in the air for 24 hours, shall not be slippery, sticky or gummy.

Specifications For Gymnasium-Type Finishes For Maple, Beech and Birch Floors

(Adapted to gymnasium floors — where general public is not admitted—and other floors under light traffic.)

A. General Requirements

Same as Heavy Duty Finishes.

B. Detailed Requirements

These shall be the same as for Heavy Duty Finishes except as noted below.

4. The material shall contain not less than 40 per cent by weight of non volatile matter.

The F. D. A. Method

Official Method of U. S. Food & Drug Administration, U. S. Department of Agriculture, and National Assn. of Insecticide and Disinfectant Manufacturers for Determination of Phenol Coefficients of Disinfectants

By G. L. A. RUEHLE and C. M. BREWER
U. S. Food and Drug Administration

ALL antiseptics and disinfectants shipped or offered for shipment in interstate commerce or offered for import into or export from the United States are subject to the provisions of the Federal insecticide act, the Federal food and drugs act, or both. In the enforcement of these acts it is necessary to determine the accuracy of the bactericidal and antiseptic claims made for such products. A number of methods have been developed for determining bactericidal effectiveness, but all of them possess certain disadvantages. Of course it is impossible to devise tests which will apply in all cases, but during the past 20 years the Insecticide and Fungicide Board and the Food and Drug Administration have found certain methods to be particularly well adapted to their purposes.

Confusion has arisen from the fact that, in many cases, manufacturers have not used the same methods of testing their products, as a basis for preparing their labels, as those used by the administration. This possibility of misunderstanding would be obviated if the same methods were employed by all, and many manufacturers, recognizing this, have requested information as to the methods employed by the Food and Drug Administration. In view of this, it seemed desirable to publish them in a form which would make them generally available.

This circular, therefore, describes briefly the methods usually employed in the insecticide control laboratory for testing official samples of antiseptics and disinfectants. No attempt is made to review the literature of disinfectant testing in detail, but the most important papers relating to the methods here presented are cited.

Determination of Phenol Coefficient[1]

There are in general use at the present time three methods of determining the phenol coefficient; the Hygenic Laboratory (H. L.) method (11)[2], that of Rideal-Walker (R-W) (7), and the method developed by this laboratory. It has been realized for a long time, especially among qualified workers in the field of phenol coefficient testing, that there were numerous handicaps and minor deficiencies to be encountered in the routine manipulation of both the H. L. and R-W methods. Lloyd P. Shippen, formerly bacteriologist of the Insecticide and Fungicide Board, after much experience in the testing of disinfectants, devised a method for obtaining phenol coefficients, utilizing as its basis the best features of the two older tests. Under pressure of a great volume of routine work this method was first put into practice more than 15 years ago and found to be so satisfactory that it has come to be used for testing the great majority of the germicides now received at the Food and Drug Administration.

George F. Reddish, successor to Doctor Shippen, later published this method under the name, "The R-W modified method" (5).

The procedure of Shippen has been little changed, but the standards for the resistance of the test organisms, *Eberthella typhi* (Schröter) Buchanan,[3] and *Staphylococcus aureus* Rosenbach, have been firmly established and provisions for the use of other organisms have been added. The method, as here published, is designated the "Food and Drug Administration phenol coefficient method" or briefly, the "F. D. A. method."

The differences in the three methods are shown in Table I. (See Next Page).

There need be very little confusion arising from substituting the F. D. A. method as a test for products previously tested by either the R-W or the H. L. methods. The phenol coefficients of the large number of substances chemically related to phenol (the only type of disinfectants for which the H. L. method is accepted) (11) are, in most cases, practically the same, whether tested by the F. D. A. or the H. L. method. Not only has continued use of the method in this laboratory shown this to be true (2), but collaborative experiments in five other laboratories (unpublished) confirm this fact. In comparing this method with the R-W method, similar results in general are obtained, although a somewhat lower coefficient usually results with coal-tar products having high coefficients. However, the higher results sometimes obtained by the R-W method may be misleading. R-W broth is not well adapted for the optimum growth of the test organism; hence negative subcultures frequently indicate that the organism has been killed, when in fact it may have been only rendered incapable of growing in this culture medium.

The curtailment in labor, time, and material through the use of the F. D. A. method renders it particularly valuable where a large number of samples are involved. The F. D. A. method is considerably superior to the R-W method in producing consistent results (4, 12). The medium employed is better adapted to bacterial growth, and the technic is not restricted to the use of one test organism (*Eberthella typhi*) as is the case of the R-W and H. L. methods. Moreover, the stock cultures of *E. typhi* and *Staphylococcus aureus*, the organisms principally used in germicidal testing, remain sufficiently constant in their resistance to phenol, when grown to an adjusted medium, to necessitate but one phenol control,

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[1] For the benefit of those unfamiliar with testing disinfectants a brief statement of the principles of determining phenol coefficients is made. The phenol coefficient is a figure expressing the ratio of the killing efficiency of a disinfectant as compared with that of phenol tested under identical conditions. The sample to be tested is diluted and the dilutions arranged in a series of decreasing concentrations (increasing dilutions). To these a specified amount of the test organism in broth culture is added. At the end of fixed periods of time a small portion of the mixture of diluted disinfectant and test organism is transferred to a nutrient culture medium and incubated. No growth in the subculture indicates that the organism has been killed. The greatest dilution (weakest concentration) of the disinfectant killing in a definite time period is divided by the greatest dilution of phenol killing in the same time period. This ratio is the phenol coefficient. It should be noted that the phenol coefficient is not based on a comparison of different time intervals but on a comparison of different concentrations acting for specified time periods.

[2] Numbers in parentheses refer to Literature Cited. Page 196.

[3] Throughout this paper the term *Eberthella typhi* is used for *Bacillus typhosus*, in accordance with the nomenclature adopted by the committee on classification of the Society of American Bacteriologists (1).

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TABLE 1.—*Differences in media and manipulation of the three methods of determining phenol coefficient.*

Item	F. D. A. method	R-W method	H. L. method
Composition of medium.....	Peptone[1], 10 gm..... Liebig's beef extract, 5 gm.... Salt, 5 gm..... Water, 1,000 c. c..... Boil 20 minutes.....	Peptone[2], 20 gm..... Liebig's beef extract, 10 gm... Salt, 10 gm..... Water, 1,000 c. c..... Boil 30 minutes.....	Peptone[1], 10 gm. Liebig's beef extract, 3 gm. Salt, 5 gm. Water, 1,000 c. c. Boil 15 minutes.
Acidity of medium.....	pH 6.8	+1.5 No definite pH.....	Unadjusted but pH between 6.0 and 7.0.
Amount of culture medium in tube.	10 c. c.....	5 c. c.....	10 c. c.
Amount of culture added to diluted disinfectant.	0.5 c. c. to 5.0 c. c.....	0.5 c. c. to 5.0 c. c.....	0.1 c. c. to 5.0 c. c.
Resistance of test culture to phenol (dilutions killing in 10 minutes but not in 5 minutes).	1-90	1-90 to 1-110.....	No limits stated.
Condition of tube in test.....	Plugged with cotton.....	Plugged with cotton.....	Open tubes.
Temperature of test.....	20° C.	15-18° C.	20° C.
Time intervals of the test....	5, 10, and 15 minutes.....	2½, 5, 7½, and 10 minutes...	5, 7½, 10, 12½, and 15 minutes.
Amount of medication mixture transferred (size of loop).	4 mm. loop (of No. 23 B. and S. gage wire).	4 mm. loop (of No. 27 Imperial gage wire).	Spiral loop (four spirals wrapped around a No. 13 B. and S. gage wire. Made of No. 23 B. and S. gage wire).
Calculation of phenol coefficient.	Highest dilution not killing in 5 minutes but killing in 10 minutes divided by same for phenol.	Highest dilution not killing in 5 minutes but killing in 7½ minutes divided by same for phenol.	Mathematical mean of highest dilutions showing no growth in 5, 10, and 15 minutes divided by same for phenol.

[1] Armour's, Special batch set aside for disinfectant testing.
[2] Allen and Hanbury's.

though two controls are used frequently as an additional check. This allows the use of nine dilutions of the unknown with 30-second intervals between transfers, or 14 when 20-second intervals are used. With a little practice, 20-second intervals allow sufficient time.

The F. D. A. method will be used by this laboratory in determining the dilutions at which miscible coal-tar disinfectants, and many other products to which the method is applicable, should be used for disinfecting purposes. As heretofore, this dilution should be at least equal in strength to a 5 per cent solution of phenol when tested against *Eberthella typhi* (20 times the phenol coefficient figure) and should be based on a phenol coefficient not higher than that obtained by the F. D. A. method.

FOOD AND DRUG ADMINISTRATION METHOD

THE test organism is a 22-26 hour culture of *Eberthella typhi* (Hopkins strain) incubated and grown in nutrient broth at 37° C. The broth contains the following ingredients: 5 gm. of Liebig's beef extract, 5 gm. of chemically pure sodium chloride, and 10 gm. of Armour's peptone (for disinfectant testing) in 1,000 c. c. of distilled water. The mixture is boiled for 20 minutes, made up to original weight (or volume) with distilled water, and adjusted with NaOH to pH 6.8 using the colorimetric method (3, p. 405-421). It is then filtered through paper, tubed (10 c. c. to each tube), and the tubes plugged with cotton and sterilized at 15 pounds pressure for 40 minutes. The test culture is transferred daily in this medium for not more than one month. At the end of each month, a fresh transfer is made from the stock culture. The stock culture is carried on agar slants of the same composition as the broth medium plus 1½ per cent Bacto-Agar (Difco), adjusted to pH 7.2 to 7.4. This medium is also filtered, tubed, plugged with cotton, sterilized, and slanted. The stock culture is transferred once a month, and the test organism is taken from the month-old stock culture. When the test organism has not been transferred daily, it is advisable to make four or five consecutive daily transfers in broth before using it for testing purposes, to be reasonably sure of its conforming to the phenol resistance requirements. When only one transfer has been skipped the following transfer from the 48-hour culture is usually satisfactory for use after 24 hours. Transfers are made with the platinum loop used in the test. Only cultures giving readings within the following limits are considered satisfactory:

Phenol	5 min.	10 min.	15 min.
1-90	+	+	0
1-100	+	+	+
or			
1-90	0	0	0
1-100	+	+	+

The following reading is that most usually obtained and is the most convenient:

Phenol	5 min.	10 min.	15 min.
1-90	+	0	0
1-100	+	+	+

PHENOL

The phenol used must meet the requirements of the United States Pharmacopoeia, and in addition the congealing point must not be below 40° C. A 5 per cent solution may be used as a stock solution if kept in a relatively cool place in well-stoppered amber-colored bottles protected from the light. This 5 per cent solution should be standardized with decinormal bromine (described under 'phenol" (10, *p.* 823), or with sodium bromide and bromate solution (9, *pp.* 404-405).

APPARATUS

Besides a number of accurately graduated pipettes, 100-c. c. glass-stoppered graduates or volumetric flasks are almost essential for the making of correct dilutions. All pipettes and graduates should be standardized. The test tubes, for containing the dilutions should be large enough to permit transfers being made without touching the sides with the transfer needle. Lipped pyrex (to withstand constant flaming) test tubes 25 by 150 mm. serve very well as these seeding or medication tubes. A water bath for holding the dilutions at the desired temperature must be provided. To maintain the temperature practically constant dur-

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ing the period of the test, the bath should be made so as to contain a relatively large volume per surface area, and should be insulated. The lid is made with well-spaced holes admitting the 25-mm. tube, but not the lip. The most convenient form of subculture tubes (tubes containing medium for incubating the tested organisms, as well as for growing the test culture) are ordinary non-lipped bacteriological test tubes 20 by 150 mm. The racks for holding the subculture tubes may be any convenient style. Blocks of wood with a series of holes bored in them are quite satisfactory. Dimensions depend somewhat on the size of the incubator, but the holes should be well spaced to insure quick selection and easy manipulation during the test. It is an added convenience to have the holes large enough to admit the medication tubes while dilutions are being made. The transfers are made with a 4-mm. (inside diameter) single loop of number 23 B. & S. gage platinum wire, 1½ to 3 inches long, set in a suitable holder such as an aluminum or glass rod approximately 0.5 cm. in diameter.

PROCEDURE

One per cent stock dilutions of the substance to be tested (or any other convenient dilution of the disinfectant, depending on the strength are made up, usually in the glass-stoppered cylinders or volumetric flasks from which the individual dilutions are then prepared. For rapid routine work, the final dilutions may be made directly in the medication tubes. In this case all excess over 5 c. c. must be removed. For more precise work and when high dilutions are required or volatile substances are dealt with, it is preferable to make up all of the dilutions in volumetric flasks and then transfer 5 c. c. of the final dilution to the medication tubes. These tubes containing 5 c. c. of each dilution (including the phenol control) are placed in the water bath at 20° C., for five minutes until the temperature of the bath is reached. Even slight variations in temperature may affect the results. The dilutions should cover the range of the killing limits of the disinfectant within 5-and 15-minute periods and should at the same time be spaced sufficiently close together to insure the desired accuracy. Five-tenths of a cubic centimeter of the test culture is then added to each of the dilutions at a time interval corresponding to the interval at which the transfers are to be made. Thus by the time 10 tubes have been seeded at 30-second intervals, four and one-half minutes will have elapsed and a 30-second interval intervenes before the transference to the subcultures is commenced. The culture is added from a graduated pipette holding sufficient culture to seed all the tubes in any one set. The pipette may be loosely plugged with cotton at the mouth end before sterilizing, as a precautionary measure. Unfiltered culture is used, but it should be thoroughly shaken 15 minutes before use and allowed to settle. The temperature of the culture should be practically that of the water bath before being added.

In inoculating the medication tubes they should be held in a slanting position, after removal from the bath, and the culture run in without the tip of the pipette touching the disinfectant. The tip may be allowed to rest against the side of the tube just above the surface of the liquid. The tubes are agitated gently but thoroughly after the addition of the culture to insure even distribution of the bacteria. Five minutes from the time of seeding the first medication tube, transfer 1 loopful of the mixture of culture and diluted disinfectant from the medication tube to the corresponding subculture tube. To facilitate transfer of uniform drops of the medication mixture, the loop is bent to form a slight angle with the stem and the medication tube is held at an angle of 60°. In other words, as the loop is withdrawn, its plane should be parallel with the surface of the liquid. At the end of 30 seconds, a loopful is transferred from subculture tube and the process continued for each successive dilution. Five minutes from the time of making the first transfer, a second set of transfers is begun for the 10-minute period and finally repeated for the 15-minute period. Before each transfer the loop is heated to red heat in the Bunsen flame and the mouth of every tube is flamed. Sterilization of the loop is effected immediately after making the previous transfer (before replugging the tubes) to allow time for sufficient cooling. Time does not permit flaming the tubes after making the transfer. For this reason, care in transferring and seeding is necessary. Due caution is observed to prevent either the seeding pipette or the transfer needle from touching the sides or mouth of the medication tube; neither should cotton threads be found adhering to the sides or mouth of these. After completion of the transferring, the subculture tubes are incubated at 37° C. for 48 hours and results read. Microscopic examinations usually suffices for this, but occasionally agglutination with antityphoid serum will aid in reading doubtful results. A 3-day incubation period or agar streak or microscopic examination may be resorted to in determining feeble growth. especially when organisms other than *Eberthella typhi* are used.

There are certain types of germicidal agents, such as many of the mercury compounds, which give very high results by phenol coefficient tests (8). Due to the high inhibitory value of such substances in preventing growth in the subcultures these figures are frequently misleading. For germicides used in the disinfection of such objects as surgical instruments, this is of particular importance and must be taken into account. Failure to appreciate this characteristic of certain compounds is much more likely to lead to error when *Staphylococcus aureus* is used rather than *Eberthella typhi* as the test organism. That false values may not be obtained for products of this type, or for any other disinfectant giving suspiciously high results, the subcultures should contain very large amounts of medium (not less than 200 c. c.) or they should be retransferred by carrying at least 4 loopfuls from the first subculture to a second tube of broth, as recommended by Shippen (8).

Other groups of disinfectants in common use, for which the phenol coefficient method of testing is not well adapted, are those compounds containing chlorine as the active agent as well as oxidizing agents in general. These are affected so materially by the pressure of organic matter that a phenol coefficient statement may grossly misrepresent their value under practical conditions of use and is very apt to be misleading to the consumer when placed on the label.

CALCULATION OF PHENOL COEFFICIENT

THE results of the test are expressed in terms of the phenol coefficient. This represents the germicidal value of the diluted disinfectant as compared with the diluted phenol control. It is a figure obtained by dividing the numerical value of the greatest dilution (the denominator of the fraction expressing the dilution) of the disinfectant capable of killing *Eberthella typhi* in 10 minutes but not in 5 minutes, by the greatest dilution of phenol showing the same results; that is, by the phenol control. Thus, if the results were as follows:

Disinfectant (X):

	5 min.	10 min.	15 min.
1-300	0	0	0
1-325	+	0	0
1-350	+	0	0
1-375	+	+	0
1-400	+	+	+
Phenol:			
1-90	+	0	0
1-100	+	+	+

The phenol coefficient would be $\frac{350}{90} = 3.89$

If none of the dilutions show growth in 5 minutes and killing in 10 minutes, the hypothetical dilution may be estimated in certain cases. This may be done only when any three consecutive dilutions show the following results:

The first, no growth in 5 minutes; the second, growth in 10 minutes but not in 15 minutes; and the third, growth in 15 minutes; for example:

If the results were as follows:

Disinfectant (X):

	5 min.	10 min.	15 min.
1-300	0	0	0
1-350	+	+	0
1-400	+	+	+
Phenol:			
1-90	0	0	0
1-100	+	+	0

the estimated phenol coefficient would be

$$\frac{325}{95} = 3.42$$

To avoid giving an impression of fictitious accuracy, the phenol coefficient is calculated to the nearest 0.1 unless the coefficient is less than 1.0. Thus, in the examples cited above, the phenol coefficients would be reported as 3.9 and 3.4 instead of 3.89 and 3.42.

In the preceding description, *Eberthella typhi* has been mentioned as the test organism. Wherever any expression of phenol coefficient occurs in literature, on labels, etc., it is assumed to mean the *E. typhi* phenol coefficient, unless otherwise stated. It is, however, the distinct intention of this department not to limit the test to the use of one organism. In fact, the test has been found adaptable to the use of a wide variety of bacterial species in the determination of phenol coefficients. In cases where some of the more strictly parasitic bacteria are used, modifications in media are necessitated, and, of course, a change in the phenol dilutions. The writers are not in a position at this time to prescribe the limits of resistance for many of the organisms that might be used. Therefore discussion of the exact technic is here omitted, with the exception of that for *Staphylococcus aureus*. Suggestions for the use of certain representative types may, however, be found in a paper by Reddish (5). When any test organism other than *E. typhi* is used it should be distinctly designated when stating the phenol coefficient.

S. aureus has been found to be an extremely useful organism for testing disinfectants and antiseptics and has been used for this purpose for a number of years. When substituted in the above test the technic remains exactly the same. The phenol dilutions, however, must be changed. The resistance of any strain of *S. aureus* used in this test must come within the following limits: At 20° C. it must survive a 1-60 dilution of phenol for 5 minutes and a 1-70 dilution for 15 minutes. The following is the minimal resistance that would be acceptable:

Phenol:	5 min.	10 min.	15 min.
1-60	+	0	0
1-70	+	+	+

In the bacteriological examination of disinfectants, the *Eberthella typhi* and the *S. aureus* phenol coefficients give, in general, sufficient information to render tests with other organisms unnecessary, except in special instances. The commonly accepted criterion that disinfectants for general use be employed at a dilution equivalent to the germicidal efficiency of 5 per cent phenol against *E. typhi* (that is, 20 times the *E. typhi* phenol coefficient) allows a reasonable margin of safety for the destruction of infective agents likely to be the object of general disinfection about premises with the possible exception of *Mycobacterium tuberculosis*. *S. aureus*, due to it subiquity resistance and ever-ready tendency to cause infection, should always be employed in testing those substances recommended for personal use or as applications for wounds. If the disinfectant is recommended for use externally the temperature of the test should be 20° C., but where such substances are recommended for use in the body cavities, such as for mouth washes, gargles, douches, etc., this test should be conducted at 37° C. In such case the test should be designated "The F. D. A. method (special) *S. aureus*, 37° C." At body temperature the *S. aureus* should show the following resistance to phenol:

	5 min.	10 min.	15 min.
1-80	+	0	0
1-90	+	+	+

Or

	5 min.	10 min.	15 min.
1-80	+	0	0
1-90	+	+	0

The previous description of this method (5) differed from this only in allowing a slightly wider latitude in the resistance of the test organism against phenol.

OTHER TESTS FOR GERMICIDES[4]

THE limitations of the phenol coefficient make it necessary in some cases to judge the germicidal preparation by other tests or by additional tests. This is particularly true of preparations that are not completely soluble or miscible in water. It is also true of certain preparations designated as antiseptics.

Soluble antiseptics or antiseptics completely miscible with water can be tested, of course, by the procedure already described as the F. D. A. *Staphylococcus aureus* phenol coefficient method. In the testing of these substances, however, the phenol coefficient is not obtained necessarily, the phenol figure being used merely as a check of the resistance of the test organism. The information desired is the concentration which will kill in five minutes.

In an effort to stimulate practical conditions, it is frequently advisable to conduct the tests in the presence of blood serum. Sterile horse serum in a concentration of 10 per cent is ordinarily used, both in the germicidal and inhibitory tests. Special claims and uses of a product, however, frequently indicate the desirability of a higher concentration of this organic enrichment.

The following methods designed for the testing of insoluble and immiscible products are in use in this laboratory at the present time. Some of them have been used for years and have been described previously (6). Laboratory tests, of course, cannot duplicate the exact conditions found in practice. The procedures here outlined, however, are as close an approach to practical conditions as is feasible in routine laboratory tests, and reveal the obviously useless preparations. It should be noted that inhibitory tests are considered along with other facts in interpreting whether or not the substance will be of value in practical use. It must be remembered that not only bacteriological but physiological and pharmacological facts frequently must be taken into consideration in judging many substances.

THE WET FILTER-PAPER METHOD

The wet filter-paper method is a germicidal test rather than a test of inhibitory properties. It is used when the substance to be tested is not soluble or completely miscible with water, or for substances that are to be used in high concentration, such as soaps, tooth pastes, suppositories, dyes, dusting powders, salves, and ointments. If the substance is to be used in the body cavaties the test is carried out at 37° C.; if not, the test is carried out at 20°, or at room temperatures, and the temperature is recorded.

No. 2 Whatman filter paper is cut into pieces about 0.5 cm. square, and sterilized in a plugged test tube at temperatures below 170° C. to prevent charring. A suitable number of the paper squares are then impregnated with *Staphylococcus aureus*, or other test organisms, by immersion in a 24-hour broth culture of the organism. The culture must have the standard resistance required for phenol coefficient testing. The wet inoculated squares are then placed in the liquid or solid substance to be tested in such a way as to be completely covered and in intimate contact. At the end of 5 minutes, 10 minutes, 15 minutes, or 1 hour, or any other desired length of time, the wet papers are removed with a sterilized, stiff, platinum wire bent at a sharp angle to form a hook and placed in 10 c. c. of sterile broth. After as much of the disinfectant as possible has been removed (in the case of sticky substances, the needle must be used to aid in freeing the squares of adherent germicide) the squares are retransferred to a fresh tube of sterile broth (10 c. c.) and the tubes incubated at 37° for 48 hours, when they are observed for evidence of growth.

It will be noted that in this test resubcultures are always required, since the first tube of broth to which the filter-paper squares have been added frequently contains sufficient antiseptic to exhibit inhibition of growth. Both tubes of broth are usually incubated.

THE DRY FILTER-PAPER METHOD

The dry filter-paper method is used in tests of fumigants and of oils that are to

[4] According to current usage the word "antiseptic" has two meanings; to kill bacteria or to prevent their growth, depending upon the use of the product. Products such as salves, ointments, and dressings that remain in contact with the body for long periods of time, may be designated properly as antiseptics if they inhibit the growth of bacteria. On the other hand, mouth washes, douches, gargles, and preparations of like nature are in contact with the body for but brief periods of time and exert negligible inhibitory action. These may be described properly as antiseptics only if they will destroy bacteria under the conditions of use; that is, in the dilutions recommended and in a period of time comparable to that in which they would have an opportunity to act when used as directed.

be used where moisture is absent. It is similar to the wet filter-paper test, squares of paper being used that have been impregnated as described under the test above, except the squares are dried for two days in a sterile Petri dish in the 37° C. incubator. This test can be used successfully only with organisms capable of resisting the drying. *Eberthella typhi* will not withstand the drying. In the writers' work *Staphylococcus aureus* is the usual test organism. The inoculated dried paper squares may be used at any time after drying up to 30 days, but the resistance of the organism at no time should fall so low that it is incapable of withstanding a 1-80 dilution of phenol for five minutes at 20°. It should be noted that control tests with non-medicated squares should always be carried out to test the viability of the test organism. As in the wet filter-paper method, resubcultures are always necessary.

THE AGAR-PLATE METHOD

The agar-plate method is a test for inhibitory properties and is used for substances remaining in contact, with the body in the absence of serous body fluids. Examples of substances which may be tested by this method are salves, dusting powders, creams, plasters, pads, adhesive tape, catgut, and suppositories. The test organism ordinarily used is *Staphylococcus aureus,* but for special purposes the test may be used with any organism capable of growing on agar. The agar is of the same composition as that previously described for carrying stock cultures of the test organism.

Fifteen to twenty cubic centimeters of agar is melted and cooled to 42°-45° C. To this is added 0.1 c. c. of a 24-hour broth culture of the test organism. The inoculated agar is then poured into a sterile Petri plate and allowed to harden. As soon as the agar has hardened, the test substance is placed in intimate contact with the surface of the agar. If a salve, it is first warmed just sufficiently to soften it and thus secure a complete peripheral contact. As a control, warmed sterile petrolatum may be placed on another portion of the plate. The plates are incubated 24-48 hours under unglazed porcelain tops at 37° C. and then are examined for evidence of inhibition. If the preparation is antiseptic or inhibitory, a zone of clear agar will be noted around the place where the substance has been in contact and the width of the zone will indicate the diffusibility of the inhibitory (antiseptic) agent. If there is no inhibition, growth of the test organism will be

[5] The authors are indebted to L. C. Himebaugh for this method.

[6] In the cases where chlorine compounds are used for this purpose the effectiveness is usually judged on the basis of "available" chlorine content.

[7] Intestinal antiseptics do not readily lend themselves to laboratory tests. When medical opinion concerning the physiological and therapeutic properties of such preparations is to be confirmed by the results of bacteriological tests, the products may be considered to be germicidal only when tested in the presence of liberal amounts of organic matter, such as saliva, feces, etc.

METHOD APPLICABLE IN A GIVEN CASE

Substance	*Method Applicable*
Soluble disinfectants:	
A. Preparations for general use.	Phenol coefficient—*E. typhi* at 20° C.
B. Preparations for antiseptic use.	Phenol coefficient technic—*S. aureus* 20° C. or 37° C. as outlined.
C. Preparations for surgical use.	Phenol coefficient technic—*S. aureus* 20° C.
Insoluble and concentrated disinfectants:	
A. Preparations for general use (oils, tarry substances, powders, lime, etc.)	Wet filter paper—*E. typhi* and *S. aureus.* Room temperature.
B. Preparations for use on dry surfaces (spraying oils, sweeping compounds, powders, lime).	Dried filter paper—*S. aureus.* Room temperature.
C. Preparations for fumigation (filter paper and exposed to gas in confined space).	Wet filter paper—*E. typhi* and *S. aureus;* room temperature. Dried filter paper—*S. aureus;* room temperature. (Extension of time may be indicated).
Soluble and liquid antiseptics:	
A. Preparations to be applied for a short time (washes, mouth washes, gargles, douches, etc.).	Phenol coefficient technic—*S. aureus* 20° C. or 37° C. as indicated.
B. Preparations for use on open wounds, etc. (washes).	Phenol coefficient technic—*S. aureus* 20° C. or 37° C. as indicated (Tested in presence of 10 per cent serum.)
C. Preparations remaining on site of application (dyes, wet dressings, rubbing preparations, etc.).	Agar cup-plate.
D. Preparations for use on open wounds, etc. (dyes, wet dressings, etc.).	Serum agar cup-plate.
E. Preparations remaining on site of application but claiming germicidal properties.	Wet filter paper—*S. aureus* 37° C. Extension of time may be indicated.
Solid soluble antiseptics:	
A. Lozenges, tablets, etc.	Wet filter paper—*S. aureus* 20° C. or 37° C. as indicated. Note: Saturated aqueous solution or in dilution indicated.
Insoluble and concentrated antiseptics:	
A. Preparations remaining on site of application (dusting powders, ointments, salves, suppositories, plasters, dressings, etc.).	Agar plate.
B. Preparations remaining on site of application but claiming germicidal properties.	Wet filter paper—*S. aureus* 37° C. Extension of time may be indicated.
C. Preparations for use on open wounds, etc.	Serum agar plate.
Antiseptic materials, appliances, etc.:	
A. Bandages, dressings, catgut, etc.	Serum agar plate.
B. Tape, pads, etc.	Agar plate.
Solid and semisolid antiseptics:	
A. Preparations used for a short time (soaps, soap powders, tooth pastes, tooth powders, etc.).	Wet filter paper—*S. aureus* 20° C. or 37° C. as indicated. (Note: Undiluted and diluted with equal parts water or diluted with sufficient water to form a thick paste or heavy emulsion.)
Disinfectants and antiseptics for use in the absence of organic matter:	
A. Preparations for drinking water.[6]	Phenol coefficient technic—*E. typhi* 20° C. (Note: 0.1 c. c. of culture to 10 c. c. of diluted preparation.)
Intestinal antiseptics.[7]	

(5 c. c. of disinfectant + 95 c. c. of distilled water = solution A)

Dilution	*Solution A* C. c.		*Distilled water* C. c.		*Solution A* C. c.		*Distilled water* C. c.		*Solution A* C. c.		*Distilled water* C. c.
1.20	= 20	+	0	or	10	+	0	or	4	+	0
1:25	= 20	+	5	or	10	+	2½	or	4	+	1
1:30	= 20	+	10	or	10	+	5	or	4	+	2
1:35	= 20	+	15	or	10	+	7½	or	4	+	3
1:40	= 20	+	20	or	10	+	10	or	4	+	4

1:45	=	20	+	25	or	10	+	12½	or	4	+	5
1:50	=	20	+	30	or	10	+	15	or	4	+	6
1:55	=	20	+	35	or	10	+	17½	or	4	+	7
1:60	=	20	+	40	or	10	+	20	or	4	+	8
1:65	=	20	+	45	or	10	+	22½	or	4	+	9
1:70	=	20	+	50	or	10	+	25	or	4	+	10
1:80	=	20	+	60	or	10	+	30	or	4	+	12
1:90	=	20	+	70	or	10	+	35	or	4	+	14
1:100	=	20	+	80	or	10	+	40	or	4	+	16
1:110	=	20	+	90	or	10	+	45	or	4	+	18
1:120	=	20	+	100	or	10	+	50	or	4	+	20
1:130	=	20	+	110	or	10	+	55	or	4	+	22
1:140	=	20	+	120	or	10	+	60	or	4	+	24
1:150	=	20	+	130	or	10	+	65	or	4	+	26
1:160	=	20	+	140	or	10	+	70	or	4	+	28
1:170	=	20	+	150	or	10	+	75	or	4	+	30
1:180	=	20	+	160	or	10	+	80	or	4	+	32
1:200	=	20	+	180	or	10	+	90	or	4	+	36
1:200	=	20	+	180	or	4	+	36	or	2	+	18
1:225	=	20	+	205	or	4	+	41	or	2	+	20½
1:250	=	20	+	230	or	4	+	46	or	2	+	23
1:275	=	20	+	255	or	4	+	51	or	2	+	25½
1:300	=	20	+	280	or	4	+	56	or	2	+	28
1:325	=	20	+	305	or	4	+	61	or	2	+	30½
1:350	=	20	+	330	or	4	+	66	or	2	+	33
1:375	=	20	+	355	or	4	+	71	or	2	+	35½
1:400	=	20	+	380	or	4	+	76	or	2	+	38
1:450	=	20	+	430	or	4	+	86	or	2	+	43
1:500	=	20	+	480	or	4	+	96	or	2	+	48

(1 c. c. of disinfectant + 99 c. c. of distilled water = solution B)

Dilution	*Solution B C. c.*		*Distilled water C. c.*		*Solution B C. c.*		*Distilled water C. c.*		*Solution B C. c.*		*Distilled water C. c.*
1:100	= 100	+	0	or	10	+	0	or			
1:100	= 100	+	10	or	10	+	1	or			
1:120	= 100	+	20	or	10	+	2	or			
1:130	= 100	+	30	or	10	+	3	or			
1:140	= 100	+	40	or	10	+	4	or			
1:150	= 100	+	50	or	10	+	5	or			
1:160	= 100	+	60	or	10	+	6	or			
1:180	= 100	+	80	or	10	+	8	or			
1:200	= 100	+	100	or	10	+	10	or	4	+	4
1:225	= 100	+	125	or	10	+	12½	or	4	+	5
1:250	= 100	+	150	or	10	+	15	or	4	+	6
1:275	= 100	+	175	or	10	+	17½	or	4	+	7
1:300	= 100	+	200	or	10	+	20	or	4	+	8
1:325	= 100	+	225	or	10	+	22½	or	4	+	9
1:350	= 100	+	250	or	10	+	25	or	4	+	10
1:375	= 100	+	275	or	10	+	27½	or	4	+	11
1:400	= 100	+	300	or	10	+	30	or	4	+	12
1:400	= 10	+	30	or	4	+	12	or	2	+	6
1:450	= 10	+	35	or	4	+	14	or	2	+	7
1:500	= 10	+	40	or	4	+	16	or	2	+	8
1:550	= 10	+	45	or	4	+	18	or	2	+	9
1:600	= 10	+	50	or	4	+	20	or	2	+	10
1:650	= 10	+	55	or	4	+	22	or	2	+	11
1:700	= 10	+	60	or	4	+	24	or	2	+	12
1:750	= 10	+	65	or	4	+	26	or	2	+	13
1:800	= 10	+	70	or	4	+	28	or	2	+	14
1:850	= 10	+	75	or	4	+	30	or	2	+	15
1:900	= 10	+	80	or	4	+	32	or	2	+	16
1:900	= 5	+	40	or	4	+	32	or	2	+	16
1:1,000	= 5	+	45	or	4	+	36	or	2	+	18
1:1,100	= 5	+	50	or	4	+	40	or	2	+	20
1:1,200	= 5	+	55	or	4	+	44	or	2	+	22
1:1,300	= 5	+	60	or	4	+	48	or	2	+	24
1:1,400	= 5	+	65	or	4	+	52	or	2	+	26
1:1,500	= 5	+	70	or	4	+	56	or	2	+	28
1:1,600	= 5	+	75	or	4	+	60	or	2	+	30
1:1,700	= 5	+	80	or	4	+	64	or	2	+	32
1:1,800	= 5	+	85	or	4	+	68	or	2	+	34
1:2,000	= 5	+	95	or	4	+	76	or	2	+	38
1:2,200	= 5	+	105	or	4	+	84	or	2	+	42
1:2,400	= 5	+	115	or	4	+	92	or	2	+	46
1:2,600	= 5	+	125	or	4	+	100	or	2	+	50
1:2,800	= 5	+	135	or	4	+	108	or	2	+	54
1:3,000	= 5	+	145	or	4	+	116	or	2	+	58
1:3,200	= 5	+	155	or	4	+	124	or	2	+	62

observed adjacent to and even under the test substance.

THE SERUM AGAR-PLATE METHOD

Preparations recommended for use on open wounds, cuts, etc., will be effective only if they exhibit activity in the presence of serous fluids. In testing such preparations the agar-plate method is modified by the addition of 10 per cent sterile horse serum to the agar.

THE AGAR CUP-PLATE METHOD[2]

The agar cup-plate method is merely a variation of the agar-plate method. It is to be used on products liquid at the temperature of the test. The agar or serum agar is inoculated as in the agar-plate method. Before the agar cools, a depression or cup is made in the medium by standing a sterile flat-bottomed glass tube, 1.5 cm. in diameter, in the liquefied agar. On hardening, the glass tube is removed by slightly twisting and pulling at the same time. Insertion of a sterile wire down the side of the tube for the introduction of air will eliminate much of the cracking of the agar. Another method of preparing the agar cup-plate is to allow the medium to harden and then cut out a disk in the agar, by means of a cork borer, 1.5 cm. in diameter. One or two drops of melted agar are placed in the cup to seal cracks or crevices. After the agar cup-plate is prepared, 6 drops of the liquid to be tested are placed in the cup and the plate incubated under an unglazed porcelain top for 24 to 48 hours. If there is a clear zone about the cup, the substance under test has inhibitory properties. Here, as well as in the agar-plate test, the agar in the clear zone may be tested for growth by subculture in broth to indicate whether the action is germicidal or merely inhibitory.

TESTS IN THE PRESENCE OF ORGANIC MATTER

In general, the tests outlined above will take care of the bulk of the preparations coming to this laboratory. However, special tests may be required to determine the value of products recommended for certain purposes. For instance, recommendations on the label may make advisable the use of various additions of organic matter, such as increased amounts of peptone or the addition of gelatin, blood ascitic fluid, saliva, urine, or feces, depending upon the information desired.

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(*Turn to Page* 201)

Peet-Grady Method

*Official Method of The National Assn. Insecticide & Disinfectant Mfrs. for Evaluating Liquid Household Insecticides**

TWO official biological methods are available for the determination of the effectiveness of household insecticides. The Peet-Grady Method was adopted as an official test in 1932 and has since been improved in minor details, all improvements having been officially accepted after satisfactory trials. The Large Group Modification of the Peet-Grady Method was officially adopted in December, 1938. Although employing the Peet-Grady chamber as the basis of the test, the procedure is sufficiently unlike the original Peet-Grady Method to warrant the name, Large Group Peet-Grady Method to distinguish it from the regular or Small Group Peet-Grady Method requiring small groups of flies as test units.

Both methods are being used extensively; and if correctly performed, evaluations by either test may be expected to be in reasonable agreement. The two methods are designed to evaluate liquid sprays in conjunction with the Official Test Insecticide as the basis of comparison.

THE LARGE GROUP PEET-GRADY METHOD

I. SCOPE

This method of test is a means of determining the relative efficiency of contact liquid insecticides used in the form of a spray. As a biological test, it is subject to variations which accompany the reaction of living organisms and should be employed under the supervision of a person familiar with the biological testing of insecticides. In order to measure with reasonable tolerances the relative position of different insecticides, the test is designed to be used in conjunction with the "Official Test Insecticide" as the basis of comparison. The outstanding feature of the method is the use of representative 500-fly test units having uniform sex ratios, prepared while the flies are in the pupal stage.

II. APPARATUS

A. Rearing Room

This room may be of any convenient size constructed so as to be free from strong drafts, separate from the testing room, and maintained at a temperature between 80 and 85 degrees Fahrenheit with a range in relative humidity between 40 and 70 per cent. It should be separate from the testing room in order to minimize the possibility of traces of insecticide coming in contact with the test insects prior to the test.

B. Testing Room

This room may be of any convenient size capable of holding the standard Peet-Grady Test Chamber and permitting adequate additional space for the operator to handle the test efficiently. While conducting tests this room shall be maintained at a temperature and humidity similar to that employed in the Peet-Grady chamber. Since the exhaust fan of the Chamber will remove relatively large quantities of air, the air inlet to this room should be constructed to permit air of approximately the specified temperature and humidity to enter the room.

C. Peet-Grady Test Chamber

The Test Chamber shall be constructed of wood or metal and lined so the inner surface is smooth and relatively non-porous. The Chamber must be externally braced and the inside must be free of cracks, projections, ledges, etc. The Chamber shall be a 6-ft. cube by internal measurements, with a tolerance of plus or minus 1 in. for any dimension. One wall shall contain a tight fitting door large enough for a man to enter conveniently, with the interior side flush with the wall when closed. One or more of the walls, or the ceiling, may contain an observation window. In the center of the ceiling a glass window, 18 in. square, with a 200 watt light bulb set 6 in. above it in a reflector, is provided for illumination. Opposite the entrance and above the observation windows a wire covered (10 mesh screening) air duct exit shall be provided to permit the ventilation of the chamber after a test. The four lower corners of the Chamber shall contain a 6 x 6 in. square port covered with wire gauze and provided with tight fitting hatches. Each wall shall have two 1 in. holes 6 in. from the ceiling and 1 ft. from the nearest corner, fitted with corks, to permit the introduction of the insecticide. The interior of the chamber is to be painted with a white enamel insoluble in petroleum distillate.

D. Fly Cages

One type of cage is used. It has a floor area approximately 1 ft. square and may be from 8 to 12 in. in height. The floor of the cage is preferably detachable to facilitate cleaning the cages and inserting a paper floor covering. The cages are constructed of wood and 16 mesh wire screening and are fitted with a sleeve opening.

E. Atomizer

The atomizer used shall be the special one constructed by the DeVilbiss Company for the N.A.I.D.M.

* These methods are not designed for the evaluation of semi-concentrate type sprays, except on a dilution basis.

Standardization Committee and obtainable from that company by referring to "special atomizer for Peet-Grady Insecticide Test — DeVilbiss Special No. 5004." The sprayer shall be operated with air maintained at a constant pressure of 12.5 plus or minus 0.5 lb. per sq. in. which must be free of oil, dust particles, or condensed moisture.

F. Apparatus for Picking Up Flies

Any convenient means of picking up the paralyzed flies without handling or appreciably disturbing them may be used. A vacuum device providing gentle suction and a sufficiently large receptacle to prevent crowding of the flies is recommended.

G. Exhaust Fan

An exhaust fan capable of moving not less than 1000 cu. ft. of air per min. is used to ventilate the chamber after each test. It shall be arranged with adequate piping to exhaust the chamber vapors outside of the building.

H. Test Insect

For evaluation purposes, the house fly (Musca domestica, L.) is used. Healthy test groups having an average age of not less than 4 nor more than 6 days are to be used. Individual flies in the test groups shall not be less than 3 nor more than 7 days old at the time of testing. The strain shall be of such susceptibility that the O.T.I. will cause a mortality of from 30 to 55 per cent.

I. Reference Insecticide

The primary reference insecticide used in this test for evaluating the unknown shall be called the current Official Test Insecticide (O.T.I.) and shall be prepared by the National Association of Insecticide and Disinfectant Manufacturers, Inc., each year. Secondary reference insecticides of greater strength, standardized for toxicity against the O.T.I. may be employed in conjunction with the O.T.I. when rating samples of high toxicity.

J. Insecticide Paper

The paper used on the chamber floor shall be specified as 60 or 70 lb. weight basis, gray bogus wrapping paper, in 36 or 40 in. widths. A new paper surface shall be exposed for each test.

III. PROCEDURE

A. Raising and Handling of Flies

Three culture jars are prepared by filling cylindrical battery jars measuring approximately 6 in. in diameter by 9 in. high, three quarters full of the synthetic medium prepared as follows:

For 3 jars:

1200 g. soft wheat bran (coarse)
600 g. alfalfa meal

Mix together thoroughly, place in jars, and then add to each jar 900 cc. of a suspension consisting of:

2700 ml. water (lukewarm)
50 ml. malt extract
30 g. compressed yeast

Mix the suspension throughout the bran-alfalfa to give a loose mixture. The proportion of liquid ingredients to dry ingredients may be varied slightly to prevent mold growth.

Eggs are deposited in the food dishes of cages containing 4 and 5 day old flies. About 2000 eggs or sufficient to give 1500 to 1800 flies per jar are transferred from the moist cotton to the jars after the medium has been mixed. The number of eggs to use may be determined by gently shaking the eggs in water for a minute, allowing them to settle out and then estimating volumetrically from a calibrated tube. One-tenth ml. of settled eggs contains about 500 eggs.

On the eighth day after preparation, most larvae should have migrated to the top inch of medium and transformed into pupae. On the ninth or tenth day the pupae are separated from the medium by lifting off the top ½ in. of the medium in each jar, loosening the exposed pupae, and then pouring the pupae with adhering particles of medium on a cafeteria tray. The pupae-medium mixture from each of the three jars is combined and then placed in a fan blast until it is of such dryness that the fan blast will effect a clean separation of the pupae and medium when the mixture is sprinkled over an inclined tray placed in the air stream.

The separated pupae are weighed into groups of approximately 500, and each group is placed in a shallow dish which is in turn placed in a cage. In this manner a series of eight or ten approximately uniform test units may be obtained from each culture. The series of test units is then kept for 5 days after peak emergence or until the second day of oviposition (usually the 15th day after the culture was prepared), each cage being supplied each morning with a 4-oz. dish containing 3 oz. of a 50 per cent dilution of milk with water, together with sufficient absorbent cotton to prevent flies from drowning. Water or other foods should not be used as certain foods have been found to affect both oviposition and susceptibility to the spray. On the day of testing the flies should be fed at least 3 hr. before spraying begins.

B. Test Procedure

On the second day of oviposition the series of cages from one culture are ready for testing. All flies in one cage are transferred to the thoroughly cleaned Peet-Grady chamber, the floor of which is covered with the specified gray bogus wrapping paper. All ports and entrances are closed, the windows are equally shaded, and a total of 12 ml. of insecticide is applied at 12.5 lb. pressure in approximately equal quantities through each spray hole, the atomizer being swung horizontally to distribute the spray to all parts of the chamber. The chamber is kept closed at an inside temperature of 85°±2° for 10 min. from the time the spraying is started. At the end of 10 min. the ports are opened and the chamber is ventilated while the flies are being picked up.

The paralyzed flies are picked up and transferred immediately to the same cage from which they were taken, the cage having been wiped out with a damp cloth and supplied with a new paper floor covering during the 10-min. exposure period.

During the subsequent 24-hr. recovery period, the cage is placed

in the rearing room and supplied with a gauze wrapped ball of cotton saturated with 10 per cent sugar solution.

The few unparalyzed flies in the chamber at the end of the 10-min. exposure period are counted and removed.

Before the next cage of flies is liberated for the second test, the chamber walls are wiped with a clean cloth saturated with rubbing alcohol containing 10 per cent acetone, and a new paper floor surface is exposed by turning or replacing the paper.

C. Assembling the Data

At the end of 24 hr. plus or minus 1 hr., the dead flies are removed from the cage and counted. Only flies that show no signs of life upon being touched may be counted as dead. The alive flies are killed by placing the cage in an oven at 170°F. for a few minutes; they are then removed and counted. The record of unparalyzed flies, dead flies, and alive flies gives the total flies in the test unit. The mortality is the percentage dead flies of total flies. Likewise, the knockdown is the percentage paralyzed flies of total flies.

IV. CONDITIONS FOR OFFICIAL EVALUATION

1. The tests shall be conducted in accordance with the procedure previously described.

2. Cages showing a natural mortality greater than 5 per cent on the day scheduled for testing shall not be used.

3. Evaluation of an unknown shall be based on the average difference between mortalities obtained with the O.T.I. and with the unknown sample, as determined by one comparison on each of three cultures. Each culture used in determining the evaluation must show an O.T.I. kill falling between 30 and 55 per cent. Replicated O.T.I. tests on one culture shall agree within 10 points.

4. The following example illustrates the order of testing and the computation of the evaluation:—
The order of testing shall be more or less random. The O.T.I. shall be replicated within each culture with the random order restricted to the first two and the last two tests in any series.

Culture	*E*		*F*		*G*	
Date	11/21		11/22		11/23	
Cage No.	*Sample*	*% Dead*	*Sample*	*% Dead*	*Sample*	*% Dead*
1	O.T.I.	36	Unknown B	55	O.T.I.	40
2	Unknown A	42	O.T.I.	46	Unknown F	54
3	Unknown C	32	Unknown C	32	Unknown E	58
4	Unknown B	50	Unknown F	55	Unknown A	46
5	Unknown E	65	Unknown A	46	Unknown C	30
6	Unknown D	55	Unknown D	60	Unknown D	58
7	Unknown F	48	Unknown E	70	O.T.I.	38
8	OT.I.	36	O.T.I.	44	Unknown B	55

	Culture Mortalities	*Average*	*Rating*	*Grade*
O.T.I.	36, 45, 39	40		
Unknown A	42, 46, 46	44.7	+ 4.7	B
Unknown B	50, 55, 55	53.3	+13.3	A
Unknown C	32, 32, 30	31.3	— 8.7	Below B
Unknown D	55, 60, 58	57.7	+17.7	AA
Unknown E	65, 70, 58	64.3	+24.3	AA
Unknown F	48, 55, 54	52.3	+12.3	A

THE SMALL GROUP PEET-GRADY METHOD

I. SCOPE

This method of test is a means of determining the relative efficiency of contact liquid insecticides used in the form of a spray. As a biological test, it is subject to variations which accompany the reaction of living organisms and should be employed under the supervision of a person familiar with the biological testing of insecticides. In order to measure with reasonable tolerances the relative position of different insecticides, the test is designed to be used in conjunction with the "Official Test Insecticide" as the basis of comparison. In this method the insecticides are tested against lots of 100 flies liberated from a stock cage. Ten paired tests of known and unknown samples are required to compensate certain biological variables.

II. APPARATUS

A. Rearing Room.....
B. Testing Room.....
C. Peet-Grady Test Chamber.....
} As described under these sections of the Large Group Peet-Grady Method

D. Fly Cages

Two types of fly cages known as stock cages and observation cages are required. The stock cages may be of any convenient dimensions providing a volume of approximately 1½ cu. ft. Each cage shall have a solid floor, a large sliding glass door, and preferably shall be equipped with a sleeve opening. The top and two sides of the cage shall be covered with 16 mesh wire screening.

Not more than 1500 flies shall be confined per cubic foot of cage volume.

The observation cages shall be in the shape of an 8-in. cube. They shall have a solid floor, a sliding glass front, and the top and two sides shall be of 16 mesh wire screening. The back panel may be provided with a suitable aperture for inserting the hand into the cage. Rubber sheets with 2¾ in. openings fitted with fruit jar caps are recommended for the back panels.

E. Atomizer.....
F. Apparatus for Picking Up Flies.....
G. Exhaust Fan.....
H. Test Insect.....
I. Reference Insecticide.....
J. Insecticide Paper.....
} As described under these sections of the Large Group Peet-Grady Method

III. PROCEDURE

A. Raising and Handling of Flies

Three culture jars are prepared by filling cylindrical battery jars measuring approximately 6 in. in diameter by 9 in. high, three quarters full of the synthetic medium prepared as follows:

For 3 jars:

1200 g. soft wheat bran (coarse)
600 g. alfalfa meal

Mix together thoroughly, place in jars, and then add to each jar 900 cc. of a suspension consisting of:

2700 ml. water (lukewarm)
50 ml. malt extract
30 g. compressed yeast

Mix the suspension throughout the bran-alfalfa to give a loose mixture. The proportion of liquid ingredients to dry ingredients may be varied slightly to prevent mold growth.

Horse manure with added water, malt, and yeast may also be used as the rearing medium. The manure, which must be fresh, is preferably pasteurized for 2 hr. at 160-165°F. After the manure is cooled, it is shredded by means of an ice crusher, placed in battery jars and packed down, leaving the jars about two-thirds full. A malt and yeast suspension as described above is then added to the manure. The volume of suspension added may vary, but should be such as to maintain a slight excess of liquid in the bottom of the jar with a thin dry layer of medium on the top at the time of pupation.

The eggs used with either medium are deposited in the food dishes of cages containing flies between 4 and 7 days old and should be kept moist until placed in the culture jars. About 2000 eggs or sufficient to give 1500 to 1800 flies per jar are transferred from the moist cotton to the jars and placed about an inch below the surface of the medium within a few hours after the medium has been mixed. The number of eggs to use may be determined by gently shaking the eggs in water for a minute, allowing them to settle out and then estimating volumetrically from a calibrated tube. One-tenth ml. of settled eggs contains about 500 eggs.

When emergence starts, usually on the tenth day following preparation of the culture, any convenient means may be used for transferring the flies to the stock cages. Screen cones to fit the jars are recommended to conduct the insects directly into cages. As the males tend to emerge first and the females last, the middle two-thirds of the emergence is used to make up a stock cage. As an alternative procedure, the stock cage may be made up of the first and last equal portions of emergence from adjacent cultures that emerge on the same day. Approximately 1500 flies are placed in one cage.

The stock cages are held for 5 days, or until the first day of oviposition, at the temperature and humidity conditions prescribed for the rearing room. Each cage is supplied each morning with a 6-oz. dish containing 5 oz. of a 50 per cent dilution of milk with water, together with sufficient absorbent cotton to prevent flies from drowning. Water or other foods should not be used as certain foods have been found to affect both oviposition and susceptibility to the spray. On the day of testing the flies should be fed at least 3 hr. before spraying begins.

B. Test Procedure

When of proper age a group of approximately 100 flies from the stock cage is liberated in the thoroughly cleaned Peet-Grady chamber, the floor of which is covered with the specified gray bogus wrapping paper. All ports and entrances are closed, the windows are equally shaded, and a total of 12 ml. of insecticide is applied at 12.5 lb. pressure in approximately equal quantities through each spray hole, the atomizer being swung horizontally to distribute the spray to all parts of the chamber. The chamber is kept closed at an inside temperature of 85°±2° for 10 min. from the time spraying is started. At the end of 10 min. the ports are opened and the chamber is ventilated while the flies are being picked up and counted. The paralyzed flies are then transferred to the observation cage placed in the rearing room, supplied with a gauze wrapped ball of cotton saturated with 10 per cent sugar solution, and left for 24 hr.

The few unparalyzed flies in the chamber at the end of the 10-min. exposure period are counted and removed.

Before the next lot of 100 flies is liberated for the second test, the chamber walls are wiped with a clean cloth saturated with rubbing alcohol containing 10 per cent acetone, and a new paper floor surface is exposed by turning or replacing the paper.

C. Assembling the Data

At the end of the 10-min. exposure period, the number of paralyzed flies and unparalyzed flies is recorded. Twenty-four hours plus or minus 1 hr. later the dead flies are counted while in the observation cage. Only flies that show no signs of life upon being disturbed may be counted as dead. The mortality is the percentage dead flies of total flies. Likewise, the knockdown is the percentage paralyzed flies of total flies.

IV. CONDITIONS FOR OFFICIAL EVALUATION

1. The tests shall be conducted in accordance with the procedure previously described.

2. The average mortality for the O.T.I. in any series of tests shall lie between 30 and 55 per cent kill. It is desirable to have the O.T.I. kill between 35 and 45 per cent of the flies.

3. No more than two unknowns may be tested in conjunction with the O.T.I. in any one series. Ten tests of the O.T.I. and of each of the unknowns shall be made in parallel; i.e., test each sample of the series the same number of times with flies of the same batch, and test every sample of the series the same number of times during any one day. The three samples in a series should be randomized in order of testing. For example, 1, 2, 3; 2, 3, 1; 3, 1, 2; etc., until thirty tests have been made. When only one unknown and the O.T.I. comprise the series, the

order should likewise be randomized. For example, 1, 2; 2, 1; 2, 1; 1, 2; etc. until twenty tests have been completed. The groups of two or three samples should be run successively on 100 fly lots from a given stock cage. Nearly all flies in the cage should be used, the cage being discarded only when there are not sufficient flies left to test another group of two or three samples. As the males are usually liberated first, these provisions tend to equalize the numbers of each sex used.

4. The standard error of the mean difference between the average O.T.I. kill and the average unknown kill must be less than 3. (See example under paragraph 6.) If it is 3 or greater, the differences between pairs were too variable and to make the results valid additional paired tests must be run to bring the standard error of the mean difference down to 3 or lower.

5. Calculate the mean difference between kill obtained with the unknown and that obtained with the O.T.I. Denote the difference between kills by the appropriate grade according to letter:—

Grade AA—excellent	+16 or higher
Grade A—good	+6 to +15
Grade B—equal to O.T.I.	—5 to +5

6. The following example illustrates the arrangement of tests and calculations described in the preceding paragraphs. When two unknowns and the O.T.I. are tested in series, the first table should consist of differences between No. 1 and the O.T.I., the second table should show differences between unknown No. 2 and the O.T.I. The method of calculation is shown in the sample below:

Mean difference equals 7.0;
Standard error of MD =

$$\frac{\sqrt{\frac{\text{Sum d}}{n-1}}}{\sqrt{n}} = \frac{\sqrt{\frac{180}{9}}}{3.16} = 1.42$$

1.42 is less than 3, thus indicating the test has been properly conducted.

The letter n (in formula above) denotes the number of paired tests. This number is always 10 except when it is necessary to run additional tests to bring the standard error of the mean difference down to 3 or less.

The unknown in the example above tests 7 points better than the O.T.I.; therefore, unknown No. 1 is an "A" grade insecticide.

Pair	*Date*	*Batch*	*Unknown No. 1 % Kill*	*O.T.I. % Kill*	*Difference*	*Deviation from Mean Difference*	*Deviation Squared*
1	12/8	12/3	58	49	+9	+2	4
2	12/8	12/3	62	50	+12	+5	25
3	12/8	12/3	50	47	+3	—4	16
4	12/9	12/4	52	46	+6	—1	1
5	12/9	12/4	60	52	+8	+1	1
6	12/9	12/4	65	50	+15	+8	64
7	12/10	12/5	54	48	+6	—1	1
8	12/10	12/5	56	57	—1	—8	64
9	12/10	12/5	51	44	+7	+0	0
10	12/10	12/5	57	52	+5	—2	4
			56.5M	49.5M	7.0MD	0	180 sum d²

F.D.A. Method

(*From Page* 196)

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The Seil Method

*for Estimation of Pyrethrins**

ALTHOUGH many attempts had been made to determine the active ingredients of pyrethrum, none were successful until Staudinger and Ruzicka[1] reported the results of their thorough investigation in 1924. These authors proved that Pyrethrin I and Pyrthrin II were the active principles of pyrethrum, and established their chemical constitution. They established the fact that the pyrethrins were esters of the same ketonic alcohol pyrethrolon combined with two different acids. Pyrethrin I was the pyrethrolon ester of chrysanthemum monocarboxylic acid and Pyrethrin II the pyrethrolon ester of chrysanthemum dicarboxylic acid.

Several methods for the estimation of the pyrethrins have been published. These can be divided into three classes:

1. Methods depending on the reducing properties of the pyrethrolon.
2. Methods depending on the ketonic group in the pyrethrolon.
3. Methods based on the acids combined with the pyrethrolon.

It is evident that methods falling into classes 1 and 2 can determine only the total pyrethrins present, while those in class 3, by determining both acids, give the amounts of Pyrethrin I and Pyrethrin II present.

The methods of Gnadinger and Corl,[6] and Martin asd Tattersfield[7] fall into class 1, since both depend on the reducing power of pyrethrolon. Staudinger and Harder,[8] and Tattersfield, Hobson and Gimingham[9] developed semicarbazone methods which fall into class 2, since they depend on the ketone group of pyrethrolon. The acid methods of Staudinger and Harder, and Tattersfield, Hobson and Gimingham fall into class 3 and differentiate the pyrethrins.

If both the pyrethrins were equally toxic, it would be immaterial which method was used for assay, provided it was accurate. However, Staudinger and Ruzicka reported Pyrethrin I to be more toxic than Pyrethrin II; Tattersfield and Hobson[2] stated that Pyrethrin I is ten times as toxic as Pyrethrin II; Wilcoxson and Hartzell[3] also state that Pyrethrin I is decidedly more toxic than Pyrethrin II; Wilson,[4] based on the figures for the concentrations of Pyrethrins I and II and the corresponding kill reported by Wilcoxson and Hartzell, mathematically calculated the relative toxicities of the pyrethrins and reported that Pyrethrin II has a toxicity of only about 7 per cent of that of Pyrethrin I; Gnadinger and Corl[5] found that Pyrethrin II possesses about 80 per cent the toxicity of Pyrethrin I.

Since the pyrethrins differ markedly in their relative toxicity, an analysis giving the total pyrethrins is not sufficient to give the true activity of a sample. For example, if two samples of pyrethrum flowers assay one per cent total pyrethrins, with sample "A" containing 0.40 per cent Pyrethrin I and 0.60 per cent Pyrethrin II, and sample "B" containing 0.46 per cent Pyrethrin I and 0.54 per cent Pyrethrin II, using Wilson's figures we find that sample "B" is 12 per cent stronger than sample "A." The Pyrethrin I content of the flowers gives a better index of their toxicity than total pyrethrins. From the Pyrethrin I content of both flowers, sample "B" is 11.5 per cent stronger than sample "A."

The proposed method is an improvement on the acid methods of Staudinger and Harder, and that of Tattersfield. The time required for an analysis is much shorter, and no special equipment is required. After the flowers have been extracted with petroleum ether, the solvent is evaporated, the residue is saponified with N/2 Ethyl alcoholic NaOH for 1 to 2 hours. After saponification is complete, the alcoholic solution is transferred to a beaker, and the alcohol removed by boiling. Since the pyrethrin acids are not precipitated with Barium Hydroxide, the fats, resins and inert material are removed by precipitation with Barium Chloride. In an aliquot of the filtrate the monocarboxylic acid is determined substantially as in the Tattersfield Method. The Dicarboxylic acid is determined by direct extraction with ether from a saturated salt solution, eliminating the mechanical extraction with ether, saving at least 19 hours in time.

The Method

METHOD—12.5 g. of 20-30 mesh powdered flowers are extracted in a Soxhlet extractor with low boiling petroleum ether. After the extraction is complete, cool and filter; the petroleum ether is recovered on a water bath. 10 to 15 c.c. of N/2 ethyl alcoholic NaOH is added and the mixture is refluxed for 1 to 2 hours. The alkaline alcoholic solution is transferred to a 600 c.c. beaker, the flask washed with water,

* Based on paper read before 20th Annual Meeting, Natl. Assn. Insecticide & Disinfectant Mfrs., New York, Dec., 1933.

and sufficient water is added to bring the volume of liquid in the beaker to 200 c.c. A few glass beads are added and the alcohol is removed by boiling, care being taken to avoid boiling over due to the soap formed by the saponification. When the volume has been reduced to 150 c.c. the solution is cooled and transferred to a 250 c.c. standard flask, to which about 1 g. of filter-cel has been previously added. The solution is thoroughly mixed to distribute the filter-cel, then 10 c.c. of 10 per cent Barium Chloride Solution is added, made up to the mark with water and thoroughly mixed. After the precipitate has settled, filter through a fluted paper. Transfer 200 c.c. of the clear filtrate to 500 c.c. Erlenmeyer flask, add 1 c.c. of conc-sulphuric acid which precipitates the excess Barium and liberates the chrysanthemum acids. Distil with steam, using a distillation trap and an efficient condenser. Receive the distillate in a 500 c.c. Squibb separatory funnel and distil until the liquid in the flask is between 15 and 20 c.c. The amount in the separatory funnel is usually 250 c.c. Allow the flask containing the dicarboxylic acid to cool.

To the separatory funnel add 50 c.c. of neutral petroleum ether, and shake thoroughly for one minute. After the liquids have separated, draw off the aqueous layer into a second 500 c.c. separatory funnel to which a second 50 c.c. of neutral petroleum ether has been added. Shake for one minute and after the liquids have separated, discard the aqueous layer. Wash the petroleum ether in the first separatory funnel with 10 c.c. of water using the same wash water for the petroleum ether in the second funnel. Repeat with a second wash water of 10 c.c. as before. Combine the petroleum ether extracts. Neutralize 15 c.c. of water containing 1 drop of phenolphthalein indicator solution with N/50 NaOH and add it to the combined petroleum ether solutions and titrate with N/50 NaOH, shaking after each addition until the aqueous layer is just pink. Each c.c. of N/50 NaOH consumed is equal to .0066 g. of Pyrethrin I. The 200 c.c. aliquot taken corresponds to 10 g. of sample. Therefore the number of c.c. consumed times .066 gives the percentage of Pyrethrin I.

The solution containing the dicarboxylic acid is filtered through a gooch crucible. The flask is washed with a litle water. The clear filtrate is made alkaline with Bicarbonate of soda and transferred to a separatory funnel. It is washed twice with chloroform. Washing the first chloroform extract with water, using the same wash water for the second chloroform wash. Combine the aqueous solutions, acidify strongly with hydrochloric acid, saturate with salt, and extract with 50 c.c. of ether, shaking for about 1 minute. Repeat the extractions with three more portions of ether, using 50 c.c. for the second and 25 c.c. each for the third and fourth extractions. Wash the ether of the first extraction with 10 c.c. of water as before. Repeat with a second wash with 10 c.c. of water as before. Combine the ether solutions. Tap off any water separating, and filter into a flask. Recover the ether on a water bath and dry the residue at 100° C. for 10 minutes. Add 2 c.c. of neutral alcohol, warm gently, then add 20 c.c. of distilled water and heat to dissolve the acid. If a residue remains undissolved, cool and filter through a gooch crucible. Add a drop of phenolphthalein indicator solution and titrate with N/50 NaOH of which 1 c.c. is equivalent to .00374 Pyrethrin II.

Method for Kerosene Extracts

VOLLMAR[10] suggested a method for determining Pyrethrin I in kerosene extracts containing no perfumes. The method just outlined can be applied to kerosene sprays. If the spray contains a perfume which may contain esters which will interfere with the estimation of the pyrethrum acids, the perfume can be removed as follows: 100 c.c. of the ordinary household extract, or less of a concentrate, is placed in a 500 c.c. flask with 50 c.c. of water. The flask is heated and steam passed through until the distillate has no perfume odor. The contents of the flask is cooled and transferred to a separatory funnel, the liquids are allowed to separate and the water tapped off into a second separatory funnel, and washed with 25 c.c. of kerosene. The oil in the first funnel is transferred to a 250 c.c. Erlenmeyer flask. The first funnel is washed with the kerosene in the second, which is then added to the flask. 20 c.c. of N/2 Ethyl Alcoholic NaOH is added and refluxed on a hot plate for 1 to 2 hours. It is then transferred to a 600 c.c. beaker, washing the flask with water, finally adding enough water to make the aqueous layer measure 200 c.c. A few beads are added and the solution boiled until the aqueous layer is 150 c.c. After cooling, the solution is transferred to a 500 c.c. separatory funnel and the kerosene separated. The alkaline aqueous solution is tapped into a 250 c.c. flask. The kerosene is washed once with 10 c.c. of water which is also added to the flask. One gram of filter-cel is added and an excess of 10 per cent Barium Chloride solution, usually 10 c.c. is sufficient. From this point proceed as in the method previously outlined.

If the spray under analysis is not perfumed, 100 c.c. is saponified directly with the alcoholic NaOH, without steam distillation.

Reactions of Chrysanthemum Carboxylic Acids

THE aqueous solutions remaining after the titration of both the acids can be used directly for the qualitative tests. If desired, the alcohol can be removed by boiling. After cooling and rendering just acid with acetic acid, and adding a little filter-cel, the phenolphthalein can be removed by filtration through a gooch crucible. With the usual reagents, the acids give the following reaction: (*See table on following page.*)

The most characteristic reaction of the chrysanthemum mono carboxylic acid is that with Deniges

Reagent	*Mono Acid*		*Di Acid*	
10% Solution	Cold	Hot	Cold	Hot
$CaCl_2$	—	—	—	—
$BaCl_2$	—	—	—	—
$AgNO_3$	—	—	—	—
$AgNO_3 + NH_4OH$	—	—	—	—
$ZnCl_2$	—	—	—	—
$Pb(C_2H_3O_2)_2$	+	+	+	+
$CuSO_4$	+	+	+	+
$FeCl_3$	+	+	+	+
$HgCl_2$	—	Reduction	—	Reduction
Fehling Solution	—	—	—	—
K Mn O_4	Reduction	Reduction	Reduction	Reduction
Br_2	Absorbed		Absorbed	

Reagent, the mercury sulphate reagent of the U. S. P. X.

If an excess of the reagent is added to an aqueous solution of the acid, a faint pink color appears at once, which gradually deepens until similar to an alkaline phenolphthalein color. The color changes to a blue red, then purple and then blue and finally a blue with a bronze tint. On further standing greenish shades develop with the formation of a yellow brown precipitate. These changes are hastened by heating to 60° C. On boiling a brownish precipitate forms. On filtration the solution contains mercurous salts which is shown by the precipitation of calomel on the addition of hydrochloric acid. This reaction will detect 0.5 mg. in a volume of 10 c.c.

The dicarboxylic acid gives no color changes with the mercury reagent but on long standing or by heating deposits a precipitate similar to that of the mono acid. The filtrate from the precipitate contains mercurous mercury.

TYPICAL ANALYSES

FLOWERS

Pyrethrin I.	*Pyrethrin II.*	*Total*
0.48%	0.60%	1.08%
0.49%	0.54%	1.03%
0.41%	0.49%	.90%
0.40%	0.51%	.91%
0.38%	0.53%	.91%
0.40%	0.59%	.99%
0.30%	0.39%	.69%
0.24%	0.35%	.57%
0.29%	0.37%	.66%
0.46%	0.59%	1.05%
0.50%	0.40%	.90%
0.32%	0.43%	.75%
0.17%	0.24%	.41%
0.04%	0.05%	.09%

EXTRACTS

grams per 100 c.c.:

0.12	.126	.246
0.57	.80	1.37
2.20	2.45	4.65
1.38	1.38	2.76
.05	.058	.108
.065	.085	.15

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Water Hardness Statistics

Approximate Average Hardness (as $CaCO_3$) of Larger Public Water Supplies in the United States, 1932

Place	*Population supplied (thousands)*	*Hardness (parts per million)*
Akron, Ohio	225	*100
Atlanta, Ga.	270	14
Baltimore, Md.	805	54
Birmingham, Ala.	305	*67
Boston, Mass.		
(Met. Dist.)	1,385	15
Bridgeport, Conn.	185	15
Buffalo, N. Y.	573	118
Chicago, Ill.	3,679	125
Cincinnati, Ohio	451	*110
Cleveland, Ohio	1,200	120
Columbus, Ohio	291	*84
Dallas, Tex.	260	*69
Dayton, Ohio	201	368
Denver, Colo.	288	*121
Detroit, Mich.	1,798	97
Flint, Mich.	156	*298
Grand Rapids, Mich.	169	*123
Hartford, Conn.	208	17
Houston, Tex.	292	**85
Indianapolis, Ind.	364	
White River		280
Wells		316
Jersey City, N. J.	404	55
Kansas City, Mo.	419	*221
Los Angeles, Calif.	1,238	
Owens River		*140
Los Angeles River		*205
Louisville, Ky.	308	*110
Memphis, Tenn.	253	39
Milwaukee, Wis.	652	126
Minneapolis, Minn.	464	*172
Nashville, Tenn.	154	*80
Newark, N. J.	1,045	29
Pequannock Supply		
Wanaque Res.		
(No. Jersey Dis.)		50
New Haven, Conn.	242	
Lake Whitney		69
Lake Dawson		22
Lake Gaillard		48
New Orleans, La.	450	*72
New York, N. Y.	6,930	
Catskill suply		20
Croton supply		51
Ridgewood supply.		*70
Oakland, Calif.	457	**70
Okla. City, Okla.	185	*121
Omaha, Neb.	214	*251
Philadelphia, Pa.	1,951	
Delaware River		69
Schuylkill River		*120
Phila, Suburban		
District Pa.	315	62
Pittsburgh, Pa.	985	*90
Portland, Ore.	302	8
Providence, R. I.	314	32
Richmond, Va.	183	*56
Rochester, N. Y.	382	
Hemlock Lake		75
Lake Ontario		105
St. Louis, Mo.	822	*83
St. Paul, Minn.	272	160
San Antonio, Tex.	232	221
San Francisco, Calif.	634	**150
Scranton, Pa.	214	**30
Seattle, Wash.	366	21
Syracuse, N. Y.	209	113
Toledo, Ohio	291	*253
Washington, D. C.	503	*93
Worcester, Mass.	195	11
Youngstown, Ohio	186	81
Total	35,048	

*Varies over a wide range. **Estimated.

Gnadinger-Corl Method

for Evaluation of Pyrethrum Flowers

Reagents. 1. Petroleum ether, 90-99 per cent distilling between 20 and 40°; maximum boiling point, 60°. Petroleum ether which does not meet these specifications should not be used.

2. Aldehyde-Free Alcohol. — Allow 95 per cent alcohol, containing 5 g. of *m*-phenylenediamine hydrochloride per liter, to stand for twenty-four hours with frequent shaking. Boil under a reflux condenser for at least eight hours, allow to stand overnight and distil, rejecting the first 10 per cent of distillate and the last 5 per cent of solution. Store in a dark place in well-filled bottles, tightly corked.

3. Basic Lead Acetate Solution — Dissolve 20 g. of Horne's basic lead acetate in sufficient recently boiled water to make 1 liter.

4. Alkaline Copper Solution.—Dissolve 2.500 g. of purest copper sulfate, $CuSO_4.5H_2O$, in about 100 c.c. of water, warming gently; cool when dissolved. Dissolve 5.000 g. of highest purity sodium potassium tartrate and 7.500 g. of purest sodium hydroxide (at least 96 per cent NaOH) separately in about 100 c.c. of cold water. Transfer the solutions to a 500-c.c. volumetric flask, mix and dilute to the mark. This solution should not be used after it is three days old.

5. Folin's Reagent. — Dissolve 150 g. of sodium molybdate, $Na_2MoO_4.2H_2O$, in 300 cc. of water. Filter through a 15-cm. quantitative filter paper into a 1-liter flask and wash with 75 cc. of water. Add 0.1 to 0.2 cc of bromine and shake until the bromine is dissolved. Let stand for one hour, then add with shaking 225 cc. of 85 per cent phosphoric acid. Add 150 cc. of sulfuric acid (1 vol. of concentrated acid mixed with 3 vols. of water and cooled). Remove the liberated bromine by means of a moderately rapid current of air; the aeration requires about half an hour. Finally add 75 cc. of 99 per cent acetic acid, mix and dilute to a volume of 1 liter.

6. Standard Dextrose Solution. — Dissolve exactly 1 g. of pure anhydrous dextrose, accurately weighed, in water and transfer to a 200-c.c. volumetric flask. Add 40 c.c. of aldehyde-free alcohol, mix and dilute to 200 c.c. with water. Transfer 10 c.c. of this solution to a 250-c.c. volumetric flask by means of a pipet, add 210 c.c. of aldehyde-free alcohol and dilute to 250 c.c. with water. Ten c.c. of this solution contains 2 mg. of dextrose. The strong dextrose solution is stable for months; the dilute solution should be made fresh each week.

Apparatus. 1. Constant-temperature water bath, set at 78°, corrected, and controlled within ± 0.2°. An oil bath should not be used instead of a water bath.

2. Colorimeter of Duboscq or Klett type, preferably with artificial illuminator.

3. Folin sugar tubes, blown to contain 15.5 cc. to base of constriction. When heated to 78° the surface of the liquid must fall between points A and B. The internal diameter of the constricted portion should be the same for all tubes in a set.

Determination.—Extract 15 g. of ground Pyrethrum flowers (about 30-mesh) for five hours with petroleum ether in a Soxhlet extractor. For samples very low in pyrethrins 20 g. may be used and for high test samples 10 g. are sufficient. Cool the petroleum ether solution which should measure less than 100 c.c. to about 20° and let stand for at least half an hour or allow to stand overnight at room temperature. Filter through a quantitative filter paper into a 400-cc. beaker, add a few grains of ignited sand and evaporate at a temperature not exceeding 75°. As soon as the last traces of petroleum ether are driven off, transfer the residue immediately with five or six portions of boiling 95 per cent aldehyde-free alcohol to a 100-cc. volumetric flask (previously marked at the 80-cc. point), using sufficient boiling alcohol to make the volume 80-85 cc. To the hot solution add from a pipet 15 cc. of basic lead acetate solution and make to the mark with hot alcohol. Shake vigorously, cool at once to 20° and again make to the mark with alcohol. Filter and to the filtrate add about 1 g. of anhydrous sodium carbonate. Let stand for ten to fifteen minutes, shaking frequently, and filter. Immediately pipet 10 cc. of the clear filtrate into a Folin tube and add, also from a pipet, 6 cc. of alkaline copper solution. Mix thoroughly, keeping the solution in the bulb of the tube. Measure 10 cc. of standard dextrose solution (2 mg. of dextrose) with a pipet into a second tube and add 6 cc. of copper solution. Place the tubes upright in the constant-temperature bath, set at 78° corrected, and heat for exactly forty-five minutes. Remove from the bath and place in water at 20° for three minutes. Add 10 cc. of Folin's reagent from a pipet and let stand for three minutes; then stopper the tubes, mix thoroughly, transfer to 100 cc. volumetric flasks and make to the mark with water. Filter through a Gooch crucible fitted with a heavy asbestos pad, using gentle suction. and discard the first 10 to 20 c.c. Do not use filter paper. The dextrose solution need not be filtered. Compare the solutions at once in the colorimeter and from the readings calculate the dextrose equivalent to the unknown solution in the usual way. Reference to the third column of Table I will give the amount of pyrethrins, in milligrams, in the unknown solution, or milligrams of pyrethrins in one-tenth of the weight of flowers taken for extraction. The following example shows the method of calculation:

Weight of flowers taken	15 g.
Colorimetric reading of standard dextrose	20 mm.
Colorimetric reading of unknown	24 mm.
Dextrose equivalent to unknown $\frac{20\times 2}{24}$, or	1.667 mg.
Pyrethrins equivalent to dextrose	11.01 mg.

Aliquot of flowers taken, $15\times \frac{10}{100}$, or 1.5 g.

Pyrethrins in 1.5 g. = 11.01 mg., or 0.734 per cent.

In making the color comparisons the standard dextrose is set at 20 mm. The unknown will then read between 14 and 50 mm., for quantities between 23 and 5 mg. of pyrethrins. If the reading is less than 12 mm., the entire amount of copper may have been reduced, and the determination should be repeated using a smaller aliquot. It is also desirable, if the reading is more than 40 mm., to run a duplicate determination using 40 g. of flowers.

Before making comparisons it is advisable to be sure that the colorimeter is not out of adjustment. This is easily done by filling both colorimeter cups with the blue solu-

Table I

Copper Reducing Power of Dextrose and Pyrethrins*

Dextrose, mg.	Pyrethrin I, mg.	Pyrethrin I and II, mg.	Dextrose, mg.	Pyrethrin I, mg.	Pyrethrin I and II, mg.	Dextrose, mg.	Pyrethrin I, mg.	Pyrethrin I and II, mg.
0.750	4.87	5.19	1.475	9.07	9.68	2.200	14.31	15.26
.775	5.01	5.34	1.500	9.23	9.85	2.225	14.52	15.49
.800	5.14	5.48	1.525	9.39	10.02	2.250	14.73	15.71
.825	5.28	5.63	1.550	9.55	10.19	2.275	14.95	15.94
.850	5.41	5.77	1.575	9.72	10.37	2.300	15.17	16.18
.875	5.55	5.92	1.600	9.88	10.54	2.325	15.40	16.42
.900	5.69	6.07	1.625	10.04	10.71	2.350	15.62	16.66
.925	5.82	6.21	1.650	10.21	10.89	2.375	15.85	16.91
.950	5.96	6.36	1.675	10.38	11.07	2.400	16.09	17.16
.975	6.10	6.51	1.700	10.55	11.25	2.425	16.33	17.42
1.000	6.24	6.66	1.725	10.72	11.43	2.450	16.57	17.68
1.025	6.38	6.81	1.750	10.89	11.62	2.475	16.81	17.93
1.050	6.52	6.95	1.775	11.07	11.81	2.500	17.05	18.19
1.075	6.67	7.11	1.800	11.24	11.99	2.525	17.31	18.46
1.100	6.81	7.26	1.825	11.42	12.18	2.550	17.58	18.75
1.125	6.95	7.41	1.850	11.60	12.37	2.575	17.85	19.04
1.150	7.10	7.57	1.875	11.78	12.57	2.600	18.11	19.32
1.175	7.25	7.73	1.900	11.96	12.76	2.625	18.38	19.61
1.200	7.39	7.88	1.925	12.15	12.96	2.650	18.67	19.91
1.225	7.54	8.04	1.950	12.33	13.15	2.675	18.95	20.21
1.250	7.69	8.20	1.975	12.52	13.35	2.700	19.25	20.53
1.275	7.84	8.36	2.000	12.71	13.56	2.725	19.56	20.86
1.300	7.99	8.52	2.025	12.90	13.76	2.750	19.86	21.18
1.325	8.14	8.68	2.050	13.10	13.97	2.775	20.20	21.55
1.350	8.29	8.84	2.075	13.30	14.19	2.800	20.55	21.92
1.375	8.44	9.00	2.100	13.49	14.39	2.825	20.89	22.28
1.400	8.60	9.17	2.125	13.69	14.60	2.850	21.24	22.65
1.425	8.76	9.34	2.150	13.90	14.82	2.875	21.59	23.03
1.450	8.92	9.51	2.175	14.11	15.05			

*Third column calculated for a mixture of equal parts of pyrethrins I and 11.

tion from the standard dextrose and setting them at the 20 mm. mark. If the instrument is properly adjusted the colors will, of course, match. If the lighting is uneven, or if air bubbles collect on the tips of the plungers, the colors will not be the same. An air bubble on the tip of a plunger may cause an error of 2 mm.; the solution will have a grayish color. After adjusting the instrument so that the colors match, when the dextrose standard is placed in both cups and set at 20 mm., leave the left cup in position, remove the right cup, rinse it several times with the unknown solution, fill and read; remove the right cup to be sure no air bubbles are trapped on the plunger tip and repeat the reading.

When assaying freshly harvested flowers, difficulty is sometimes experienced in obtaining a clear filtrate of the alcoholic solution which has been clarified with lead acetate. The slight cloudiness of the filtrate does not affect the accuracy of the results. In such cases 2 g. of anhydrous sodium carbonate should be used to remove the excess of lead.

Blank determinations should be run on every new lot of reagents. No difficulty was experienced in obtaining blanks equivalent to 0.05 mg. of dextrose, and for this reason no correction for the blank was made in calculating Table I. Reagents that yield a blank equivalent to more than 0.10 mg. of dextrose should be rejected. High blanks may be due to impurities in any of the reagents, but the sodium potassium tartrate, sodium molybdate and aldehyde-free alcohol especially should be carefully tested. If the blank is between 0.05 and 0.10 mg. of dextrose, when compared with the standard dextrose solution, the error due to the blank is negligible.

The petroleum ether extract should not be heated longer than necessary to drive off the solvent. Generally only 5 or 10 minutes' heating above 60° will be required if the petroleum ether meets the specifications given.

The proportion of alcohol and water in the contents of the Folin tubes is carefully adjusted; if more alcohol is used the copper salts will be precipitated; if the percentage of water is increased the pyrethrins will be thrown out of solution. In either case incorrect results will be obtained. The Folin tubes should be dried before using and the measurements should be made with pipets. Smaller aliquots than 10 cc. can be used for a determination, but sufficient aldehyde-free alcohol (80.5 per cent) must be added to the tube to make the total volume of the pyrethrin solution 10 cc. Larger aliquots than 10 cc. cannot be used.

It is essential that the bath be maintained at 78° corrected, ±0.2°, and a stirrer must be provided to insure even temperature and circulation around the tubes, which should be immersed to a depth of 8 to 10 cm. Variations in time of heating or

(*Turn to Page* 210)

Table II

Determination of Pyrethrin Content of Flowers and Stems

No.	Description of sample	Pyrethrins, %
7	Pyrethrum flowers, 1928 crop	0.40
6	Pyrethrum flowers, 1927 crop	.43
13	Pyrethrum flowers, 1925 crop	.44
21	Pyrethrum flowers, 1925 crop	.45
16	Pyrethrum flowers, 1925 crop	.47
14	Pyrethrum flowers, 1925 crop	.53
4	Pyrethrum flowers, 1927 crop	.56
11	Pyrethrum flowers, 1925 crop	.57
5	Pyrethrum flowers	.59
3	Pyrethrum flowers, 1928 crop	.80
2	Pyrethrum flowers, 1926 crop	0.87
20	Pyrethrum flowers, 1928 crop	.94
19	Pyrethrum flowers, 1928 crop	1.10
17	Pyrethrum flowers, 1928 crop	1.17
18	Pyrethrum flowers, 1928 crop	1.20
1	Pyrethrum flowers, 1928 crop	1.21
8	Dalmatian stems, 6 years old	0.00
9	Spanish stems, 1927 crop	.04
15	Dalmatian stems	.04
22	Daisy flowers, 3 years old	.00

Rotenone Determination

*Crystallization Method**

WEIGH 30 g. (if sample contains more than 7% rotenone use a quantity that will give 1.0-1.5 g. of rotenone in the 200 cc. aliquot) of finely powdered root and 10 g. of decolorizing carbon into 500 cc. glass-stoppered Erlenmeyer flask. Add 300 cc. of chloroform measured at definite room temperature; place flask on shaking machine and fasten stoppers securely. Agitate vigorously for not less than four hours, preferably interrupting shaking with overnight rest (or flask may be shaken continuously overnight). Remove flask from machine and allow to cool in refrigerator for at least an hour. Filter mixture rapidly into suitable flask, using fluted paper without suction and keeping funnel covered with watch glass to avoid loss from evaporation. Stopper flask and adjust temperature of filtrate to that of original chloroform.

Transfer exactly 200 cc. of this solution to 500 cc. Pyrex Erlenmeyer flask and distil until only about 25 cc. remains in flask. Transfer extract to 125 cc. Erlenmeyer flask, using carbon tetrachloride to rinse out the 500 cc. flask. Evaporate almost to dryness on steam bath in current of air. Then remove remainder of solvent under reduced pressure, heating cautiously on steam bath when necessary to hasten evaporation. (Suction may be applied directly to flask). Dissolve extract in 15 cc. of hot carbon tetrachloride and again, in a similar manner, remove all solvent. Repeat with another 10-15 cc. portion of hot carbon tetrachloride. (This treatment removes all chloroform from the resins. The chloroform extract is usually completely soluble in carbon tetrachloride. If small quantities of insoluble material are present, the purification procedure described later will eliminate them. However, if large quantity of insoluble residue should remain when extract is dissolved in first portion of carbon tetrachloride, it should be filtered off and thoroughly washed with further portions of hot solvent, after which the filtered solution plus washings should be treated as directed above for removal of chloroform).

Add exactly 25 cc. of carbon tetrachloride and heat gently to completely dissolve extract. Cool flask in ice bath for several minutes and seed with a few crystals of rotenone-carbon tetrachloride solvate if necessary. Stopper flask and swirl until crystallization is apparent. If at this stage only a small quantity of crystalline material separates, add an accurately weighed quantity of pure rotenone estimated to be sufficient to assure that final result, expressed as pure rotenone, is at least one g. Then warm to effect complete solution, and again induce crystallization. At same time prepare saturated solution of rotenone in carbon tetrachloride for washing. Place flasks containing extract and washing solution in ice bath capable of maintaining temperature of 0° C. and allow to remain overnight.

After 17-18 hours in ice bath, rapidly filter extract through weighed Gooch crucible fitted with disc of filter paper, removing flask from ice bath only long enough to pour each fraction of extract into crucible. Rinse residue of crystalline material from flask and wash under suction with sufficient of ice-cold saturated solution (usually 10-12 cc.) to remove excess mother liquor. Allow crucible to remain under suction for about 5 minutes and then dry to constant weight at 40° C. (which usually requires about an hour). The weight obtained is "crude rotenone-carbon tetrachloride solvate."

Break up contents of crucible with spatula, mix thoroughly, and weigh 1 g. into 50 cc. Erlenmeyer flask. Add 10 cc. of alcohol that has previously been saturated with rotenone at room temperature, swirl flask a few minutes, stopper tightly, and set aside at least four hours, preferably overnight, at the same temperature. Filter on weighed Gooch crucible fitted with disc of filter paper. Rinse crystals from flask and wash under suction with solution of ethyl alcohol saturated with rotenone at temperature of recrystallization. (About 10 cc. will usually be required). Allow crucible to remain under suction 3 to 5 minutes and then dry at 105° C. to constant weight, which should be effected in one hour.

Multiply weight expressed in grams by weight of the "crude rotenone-carbon tetrachloride solvate" and to product add 0.07 g., which represents correction for rotenone held in solution in the 25 cc. of carbon tetrachloride used in crystallization. If any pure rotenone has been added, subtract its weight from value obtained. This gives the weight of pure rotenone contained in the aliquot of the extract, representing 20 grams of the sample.

Alternate extraction procedure—

If sample is one in which ratio of rotenone to total extract is greater than 40%, use quantity sufficient to contain 1.0-1.5 g. of rotenone and

(*Turn to Page* 209)

* Jones, H. A. & Graham, J. J. T., Ind. & Eng. Chem., Anal. Ed., 10, 19, 1938. Jones, H. A. & Graham, J. J. T., J Assoc. Official Agr. Chemists, 21, 148, 1938. Graham, J. J. T., J. Assoc. Official Agr. Chemists, 22, 408, 1939.

Mercury Reduction Method

for Determination of Pyrethrin I

Wilcoxon-Holaday

Reagents

(a) Deniges Reagent: Mix 5 g. of yellow mercuric oxide with 40 c.c. of water and while stirring slowly add 20 c.c. of sulfuric acid; then add another 40 c.c. portion of water and stir until completely dissolved. Test for absence of mercurous mercury by adding a few drops of (b) to 10 c.c. and titrating with (c) as directed under determination.

(b) Iodine Monochloride Solution: Dissolve 10 g. of potassium iodide and 6.44 g. of potassium iodate in 75 c.c. of water; add 75 c.c. of hydrochloric acid and 5 c.c. of chloroform in a glass-stoppered bottle and adjust to faint iodine color (in chloroform) by adding dilute potassium iodide or potassium iodate solution. If there is much iodine set free, use a stronger solution of KIO_3 than 0.01 molar at first, making final adjustment with 0.01 molar solution. Keep in dark cupboard and readjust when necessary.

(c) Standard Potassium Iodate Solution: 0.01 Molar: Dissolve 2.14 g. of pure potassium iodate, previously dried at 105° C., in water and dilute to 1 liter. One c.c. of this solution is equivalent to 0.0044 g. of Pyrethrin I, and needs no further standardization.

Determination

Extract a quantity of sample that will contain from 20 to 75 mg. of Pyrethrin I (12.5-20.0 g.) in a Soxhlet or other efficient extraction apparatus 7 hours with petroleum ether, and evaporate petroleum ether on water bath heating no longer than necessary to remove solvent. Do not pass current of air through flask during evaporation.

Add 15-20 c.c. of 0.5 *N* alcoholic sodium hydroxide solution to flask containing pyrethrum extract, connect to reflux condenser and heat on steam bath or electric hot plate 1 to 1.5 hours. Transfer to 600 c.c. beaker and add sufficient water to bring the volume to 200 c.c. Add a few glass beads, or preferably use boiling tube, and boil down to 150 c.c. Transfer to 250 c.c. volumetric flask, add 1 g. of filter-cel and 10 c.c. of 10 per cent barium chloride solution. Do not shake before making to volume. Make to volume, mix thoroughly, filter off 200 c.c., neutralize with sulfuric acid (1 + 4) and add 1 c.c. in excess, using 1 drop of phenolphthalein as indicator. (If necessary to have solution stand overnight at this point, it should be left in alkaline condition.) Filter through a 7 cm. filter paper that has been coated lightly with suspension of filter-cel in water, and wash several times with water on Buchner funnel. Transfer into 500 c.c. separatory funnel and extract with two 50 c.c. portions of petroleum ether. Wash extracts with two or three 10 c.c. portions of water, discard washings, and filter petroleum ether extract through plug of cotton into clean 250 c.c. separatory funnel. Wash cotton with 5 c.c. of petroleum ether. Extract petroleum ether with 5 c.c. of 0.1 *N* sodium hydroxide, shaking vigorously. Draw off aqueous layer into 100 c.c. beaker, wash petroleum ether with 5 c.c. of water or with an additional 5 c.c. of 0.1 *N* sodium hydroxide, and add this to the beaker. Add 10 c.c. of Deniges' reagent to beaker and let stand one hour. Add 20 c.c. of alcohol to beaker and precipitate reduced mercury sulfate with 3 c.c. of saturated sodium chloride solution. Warm to about 60°, filter through a small filter paper, and wash with 10 c.c. or more of hot alcohol, transferring all precipitate to the filter paper. Wash with two or more 10 c.c. portions of hot chloroform, and place filter paper and contents in 250 c.c. glass-stoppered Erlenmeyer flask. Add 30 c.c. of concentrated hydrochloric acid and 20 c.c. of water to the flask and cool; add 6 c.c. of chloroform or carbon tetrachloride and 1 c.c. of iodine monochloride solution and titrate with the iodate solution shaking vigorously after each addition until there is no iodine color in chloroform layer. From the number of c.c. of the standard iodate solution used in the titration calculate percentage of Pyrethrin I in the sample.

Potassium iodate reacts with mercurous mercury to form mercuric mercury and iodine. Further addition of iodate in presence of hydrochloric acid oxidizes iodine to iodine monochloride.

1. $5HgCl + 6HCl + KIO_3 = I + 5HgCl_2 + KCl + 3H_2O$
2. $2I_2 + KIO_3 + 6HCl = 5ICl + KCl + 3H_2O$

(Combining 1 and 2 gives the following equation)

3. $4HgCl + KIO_3 + 6HCl = 4HgCl_2 + ICl + KCl + 3H_2O$

Addition of iodine monochloride does not change volume relationships between mercurous mercury and iodate solution and aids in determining the end-point in the titration of small quantities of mercury. The end-point is taken when red color disappears from chloroform layer. The end-point is not permanent. Therefore titration should be completed

rapidly with vigorous shaking after each addition of iodate.

Pyrethrin II

Filter if necessary aqueous residue from the petroleum ether extraction in the determination of Pyrethrin I by the mercury reduction method, through a Gooch crucible. Concentrate the filtrate to about 50 c.c., transfer to a separatory funnel and make alkaline with sodium bicarbonate. Extract twice with chloroform and wash the chloroform extract through about 15 c.c. of water in each of two separatory funnels. Combine aqueous solution and washings, acidify strongly with hydrochloric acid (use about 8 c.c.), saturate with sodium chloride, adding cautiously at first to prevent excessive ebullition of carbon dioxide, and extract with 50 c.c. of ethyl ether. Draw off aqueous layer into a second separatory funnel and extract again with 50 c.c. of ether. Continue this extraction and drawing off aqueous layer using 35 c.c. for third and fourth extractions. Wash the four ether extracts successively with 10 c.c. of water, and repeat with second successive washing with another 10 c.c. of water. Combine ether solutions, draw off any water that separates and filter through a plug of cotton into 500 c.c. Erlenmeyer flask. Evaporate ether on water bath and dry residue at 100° C. for 10 minutes. Add 2 c.c. of neutral alcohol and 20 c.c. of distilled water and heat to dissolve acid. Cool, filter through a Gooch crucible, add drop or two of phenolphthalein indicator solution and titrate with 0.02 *N* sodium hydroxide solution, of which 1 c.c. is equivalent to .00374 g. of Pyrethrin II.

PYRETHRUM EXTRACT IN MINERAL OIL

Reagents

—See Pyrethrum Powder

Determination

Weigh or measure a quantity of sample that will contain 20-75 mg. of Pyrethrin I, and transfer into 300 c.c. Erlenmeyer flask. Add 20 c.c. or more if necessary of normal alcoholic NaOH solution to the flask containing the pyrethrum extract, connect to reflux condenser, and heat on steam bath or electric hot plate 1-1.5 hours. Transfer to 600 c.c. beaker and add sufficient water to make aqueous layer to 200 c.c. If more than 20 c.c. of alcoholic soda has been used, add sufficient water so that all alcohol will be removed when the volume has been reduced to 150 c.c. Add a few glass beads, or preferably use a boiling tube, and boil the aqueous layer down to 150 c.c. Transfer the contents of the beaker to a 500 c.c. separatory funnel and draw off the aqueous layer into a 250 c.c. volumetric flask. Wash the oil layer once with water and add the wash water to the aqueous portion. After drawing off the aqueous layer and washings, if a slight emulsion still persists, it may be broken by addition of 2-3 c.c. of 10 per cent barium chloride solution. Do not shake vigorously after adding the barium chloride, otherwise a reversed emulsion that is difficult to separate may be formed. To the aqueous solution in the 250 c.c. flask, add 1 g. of filter-cel and 10 c.c. or more of 10 per cent barium chloride solution. Do not shake before making to volume. Make to volume, mix thoroughly and filter off 200 c.c. Test filtrate with barium chloride to see if sufficient has been added to obtain a clear solution. Neutralize with sulfuric acid (1 + 4) and add 1 c.c. in excess, using one drop of phenolphthalein as indicator. From this point, proceed as directed under Pyrethrum powder for determination of Pyrethrin I.

NOTE: Chrysanthemum monocarboxylic acid reacts with Deniges' reagent to form a series of colors beginning with phenolphthalein red, which gradually changes to purple, then blue and finally bluish green. The color reaction is very distinct with 5 mg. of monocarboxylic acid and quantities as low as 1 mg. can usually be detected. Therefore no Pyrethrin I should be reported if the color reaction is negative.

When analyzing samples containing much perfume or other saponifiable ingredients such as thiocyanates, it may be necessary to use as much as 50 c.c. of normal alcoholic NaOH.

Rotenone Determination

(*From Page* 207)

successively extract four times with $CHCl_3$, using 200 cc. each for second to fourth extractions. Filter after each extraction and return marc to flask for extraction with fresh solvent. Finally combine extracts, evaporate almost to dryness, and proceed as directed above, beginning at point where aliquot has been evaporated almost to dryness.

Remarks:

Both chloroform and carbon tetrachloride should be of reasonably high purity and entirely free of water and acid.

The saturated solution of rotenone in carbon tetrachloride may be prepared by adding excess of rotenone, warming to effect solution and then keeping at 0° C. in ice bath overnight and filtering immediately before using; or by dissolving 0.27 g. of pure rotenone in 100 cc. of carbon tetrachloride and then cooling to 0° C. for use.

In very hot weather it is advisable to weigh flasks and contents at beginning of extraction and again before filtering. If there is appreciable loss, the original weight should be restored by the addition of chloroform before contents of flask are filtered. It is also advisable in hot weather to cool crucibles in refrigerator immediately before use.

A suitable crystallizing bath may be made by enclosing a covered pan in a carton or box and insulating with excelsior or other packing material. In use, flasks are placed in pan and surrounded with cracked ice. The assembly should be of such size that it can be placed in refrigerator.

Total Ether Extract in Derris or Cube Root

Extract 5 g. of finely powdered root in a Soxhlet or other efficient extraction apparatus with ethyl ether for 48 hours. After extraction, concentrate extract and filter off any insoluble material that may be present. Receive filtrate in tared beaker, evaporate off ether on steam bath, and dry in oven at 105° C. to constant weight.

1939 Soap Output Sets Record

The American soap industry produced more than three and one-half billion pounds of soaps of all kinds in 1939, according to figures released last month by the U. S. Bureau of the Census and reported in the December, 1940, issue of *Soap and Sanitary Chemicals*. With the value of the industry's 1939 output reaching above three hundred million dollars, new records for both tonnage and value were established. Detailed statistics on the types of products, as reported in the preliminary census report, are included in the accompanying table. Figures for 1939 are subject to correction.

[1] Revised; glycerin included in the Chemicals Not Elsewhere Classified industry for 1937.
[2] Rosin reported used in the manufacture of Soap and Glycerin amounted to 75,401,813 pounds in 1939 and 75,450,320 pounds in 1937.
[3] Produced by establishments classified in the Soap and Glycerin industry only. Cleansers and scouring powders containing no soap classified in the Cleaning and Polishing Preparations, Blackings, and Dressings industry.
[4] Shaving cream containing no soap is classified in the Perfumes, Cosmetics, and Other Toilet Preparations industry.
[5] Produced by establishments classified in the Soap and Glycerin industry only.
[6] The total production of crude glycerin, as reported to the Division of Cotton and Oils, Census Bureau, for 1939 was 184,476,395 pounds. Most of this was further refined and sold or used as glycerin, dynamite grade, or glycerin, chemically pure.

Gnadinger-Corl Method

(*From Page* 206)

in temperature will yield results that are not comparable with Table I. After removing the tubes from the bath they should be treated as nearly alike as possible; therefore it is inadvisable to run more than 3 or 4 tubes at a time.

The dextrose used as standard in this work was of the highest purity obtainable and was dried for 30 days over sulfuric acid. All volumetric glassware, weights and thermometers used were Bureau of Standards certified. Colorimeter readings were made with artificial light and a blue glass screen.

The foregoing method was applied to pyrethrum flowers and stems and to daisy flowers. The pyrethrin content varied, in the samples examined, from 0.40 to 1.21 per cent, duplicate determinations agreed within 0.03 per cent or less. Stems contained only one-tenth as much pyrethrins as the flowers; daisy flowers contained no pyrethrins.

Products of Soap Industry by Kind, Quantity, and Value: 1939 and 1937

	1939	1937
1. Soap and Glycerin industry, all products, total value	$302,634,474	$301,291,547
2. Soap and glycerin	276,395,722	280,359,829
3. Other products (not classified in this industry)	26,238,752	20,931,718
4. Soap and glycerin made as secondary products in other industries, value	15,550,485	16,318,715
Soap and glycerin, aggregate value (sum of 2 and 4)	$291,946,207	[1]$296,678,544
Bar soap:		
Toilet soap:		
Pounds	405,083,669	360,610,753
Value	$64,919,683	$62,805,065
Laundry soap:		
White:		
Pounds	660,766,458	488,979,981
Value	$29,887,998	$28,192,491
Yellow:[2]		
Pounds	580,215,263	633,441,319
Value	$27,752,768	$33,195,616
Granulated, powdered, and sprayed soap:		
Pounds	894,727,289	743,194,783
Value	$75,631,820	$68,408,836
Soap chips and flakes:		
Packaged:		
Pounds	284,143,533	274,275,994
Value	$24,984,799	$28,207,372
Bulk:		
Pounds	135,071,434	116,179,494
Value	$9,582,030	$9,797,688
Washing powders:		
Packaged:		
Pounds	133,638,514	146,924,947
Value	$5,506,608	$6,582,021
Bulk:		
Pounds	114,703,458	85,486,294
Value	$3,331,965	$2,521,640
Cleansers and scouring powders cont. soaps:[3]		
Packaged:		
Pounds	167,441,482	157,039,241
Value	$6,948,037	$6,254,838
Bulk:		
Pounds	18,708,354	21,307,024
Value	$796,336	$917,323
Shaving soap, total value	$8,429,262	$9,729,538
Stick, powder, and cake:		
Pounds	5,678,803	5,075,521
Value	$2,196,964	$1,954,272
Cream (soap base):[4]		
Pounds	7,611,401	9,555,764
Value	$6,232,298	$7,775,266
Liquid soap, not inc. packaged shampoos:		
Pounds	39,163,707	29,869,959
Value	$3,339,735	$2,435,296
Soap stock or base, for sale as such:[5]		
Pounds	4,350,109	4,521,988
Value	$285,673	$346,947
Bar cleansers containing soap:[5]		
Pounds	4,953,566	5,446,732
Value	$303,202	$410,544
Hand paste or mechanics' paste:		
Pounds	18,747,809	16,930,579
Value	$1,060,979	$1,062,295
Textile soap, including potash and foots soap for textile manufacture:		
Pounds	63,671,392	60,707,640
Value	$5,013,616	$5,357,793
Potash soap, other than textile and liquid:		
Pounds	30,928,845	25,071,652
Value	$2,129,457	$2,156,599
Soap not reported according to classifications above, value	$3,559,607	$3,421,584
Glycerin:[6]		
Crude:		
Pounds (basis 80 per cent)	29,461,738	24,180,767
Value	$2,375,243	$3,592,537
Dynamite grade:		
Pounds	64,293,972	43,586,391
Value	$6,595,283	$7,822,600
Chemically pure:		
Pounds	90,484,348	78,813,063
Value	$9,512,106	$13,459,921

Factory Consumption of Primary Animal and Vegetable Fats and Oils, By Class of Products, Calendar Year 1940

(Quantities in thousands of pounds)

KIND	TOTAL	Shortening	Oleomargarine	Other Edible Products	Soap	Paint and Varnish	Linoleum and Oilcloth	Printing Inks	Miscellaneous Products	Loss (including oil in foots)
TOTAL	4,737,858	1,196,424	255,953	480,378	1,722,634	434,736	111,813	21,178	367,670	147,072
Cottonseed oil	1,279,960	823,359	115,947	263,323	2,971	65	.....	152	2,793	71,350
Peanut oil	39,530	22,516	1,728	9,743	387	.....	.....	.....	1,334	3,822
Coconut oil	528,203	17,576	21,783	54,689	396,857	1,261	.....	2	4,531	31,504
Corn oil	88,390	746	419	70,956	3,638	174	.....	.....	2,110	10,347
Soybean oil	431,641	212,317	87,106	39,980	17,612	29,828	7,254	82	16,538	20,924
Olive oil, edible	4,809	.....	.....	4,570	130	.....	.....	.....	109	.....
Olive oil, inedible	6,125	.....	.....	.....	1,637	7	.....	.....	4,481	.....
Sulphur oil or olive foots	15,884	.....	.....	.....	14,948	.....	.....	.....	936	.....
Palm-kernel oil	6,773	1,146	.....	4,772	197	.....	.....	.....	24	634
Palm oil	157,213	33,224	4	3,081	84,934	2	.....	2	*32,302	3,664
Babassu oil	55,481	381	6,148	5,759	41,221	.....	.....	.....	8	1,964
Sesame oil	1,343	24	.....	1,133	38	.....	.....	.....	34	114
Rapeseed oil	8,788	.....	.....	.....	49	88	.....	.....	8,651	.....
Linseed oil	386,225	.....	.....	.....	1,489	270,239	84,262	17,108	13,013	114
Tung oil	59,057	.....	.....	.....	.....	54,611	2,064	1,728	654	.....
Perilla oil	18,645	.....	.....	.....	.....	14,659	2,387	1,108	491	.....
Castor oil	54,046	.....	.....	.....	1,225	24,368	137	352	27,950	14
Other vegetable oils	23,369	32	.....	5,020	2,051	8,336	706	20	6,756	448
Lard	29,519	16,786	5,098	6,587	645	.....	.....	9	135	259
Edible animal stearin	27,073	16,940	3,387	5,926	549	.....	.....	6	231	34
Oleo oil	15,886	880	14,333	62	127	.....	.....	.....	453	31
Tallow, edible	46,750	39,595	.....	4,777	657	.....	.....	1	1,611	109
Tallow, inedible	884,685	.....	.....	.....	786,456	141	2	12	97,441	633
Grease	356,513	.....	.....	.....	256,886	94	.....	410	98,370	753
Neat's-foot oil	5,550	.....	.....	.....	19	28	.....	.....	5,498	5
Marine mammal oils	26,885	.....	.....	.....	19,250	48	.....	7	7,580	.....
Fish oils	179,515	10,902	.....	.....	88,661	30,787	15,001	179	33,636	349

*Includes 31,075 thousand pounds reported by the tin and terne plate industry.

Fat and Oil Consumption

By The American Soap Industry 1933-1940

Fats and Oils	1933 (1000 lb.)	1934 (1000 lb.)	1935 (1000 lb.)	1936 (1000 lb.)	1937 (1000 lb.)	1938 (1000 lb.)	1939 (1000 lb.)	1940 (1000 lb.)
Tallow	508,824	662,858	663,002	660,020	613,509	702,267	785,041	786,456
Coconut oil	322,264	341,124	229,711	307,376	252,241	342,982	388,912	396,857
Palm oil	187,962	154,704	87,311	78,453	141,358	91,642	102,146	84,934
Grease	124,743	142,782	98,086	98,714	94,247	96,356	120,856	256,886
Fish oils	52,168	64,548	109,970	128,044	123,879	79,874	114,961	88,661
Whale oils	44,895	33,996	28,440	32,603	65,130	66,080	51,522	19,250
Palm-kernel oil	6,278	16,516	37,173	26,443	111,514	29,498	3,657	197
Olive foots	31,878	30,411	31,507	23,965	17,984	15,013	19,068	14,958
Soybean oil	4,235	1,354	2,549	5,023	10,274	10,897	11,177	17,612
Babassu oil	....	..	....	8,993	14,308	8,289	37,633	41,221

APPROXIMATE CONSTANTS OF SOAP OILS

Oil or Fat	Sp. Gr. (Water at 15°)	Sap. No.	Iodine Value	Titer °C.	% Non-Sap.
Castor Oil	0.958—0.968	177—187	83— 86	3°—	0.3—0.5%
Coconut Oil	0.926	251—263	8— 10	20°—23°	0.2
Corn Oil	0.921—0.927	186—193	120—130	15°—19°	1.5—3.0%
Cottonseed Oil	0.915—0.926	191—196	103—115	32°—38°	0.7—1.6%
Linseed Oil	0.931—0.938	189—196	170—204	19°—21°	0.5—1.6%
Olive Oil Foots	0.914—0.919	189—195	79— 86	17°—21°	2.0—3.0%
Palm Oil	0.921—0.925	196—205	48— 58	42°—45°	0.7—1.0%
Palm Kernel Oil	0.873/99°	244—255	16— 23	20°—25°	0.2—0.5%
Peanut Oil	0.911—0.926	185—192	83— 95	28°—30°	0.5—1.0%
Sesame Oil	0.920—0.926	188—193	103—115	21°—24°	1.0—1.8%
Soya Bean Oil	0.922—0.925	191—194	125—140	21°—24°	0.3—0.6%
Tallow (beef)	0.943—0.952	193—200	35— 47	43°—45°	
Whale Oil	0.922—0.926	188—194	110—150	22°—24°	1.0—3.0%

FATTY ACIDS IN SOAP OILS

Glycerides of Acids	Coconut Oil	Corn Oil	Cottonseed Oil	Linseed Oil	Olive Oil	Palm Oil	Palm Kernel Oil	Peanut Oil	Sesame Oil	Soyabean Oil	Tallow	Whale Oil
Arachidic	—	0.4	0.6	—	0.2	—	—	3.6	4.0	0.7	—	—
Lignoceric	—	0.2	—	—	—	0.1	—	2.9	0.4	0.1	—	—
Linolenic	—	—	—	34.1	—	—	—	—	—	2.2	—	—
Linoleic	—	39.1	42.0	48.5	3.9	9.5	1.0	23.1	35.2	49.3	—	20.0
Myristic	20.0	—	0.4	—	Trace	0.6	16.0	—	—	—	2.0	8.0
Oleic	2.0	43.4	35.0	5.0	83.1	43.2	16.5	56.7	46.0	32.0	44.5	25.0
Palmitic	7.0	7.3	20.0	2.7	9.2	44.0	6.5	7.3	7.3	6.5	29.0	12.0
Palmitoleic	—	—	—	—	—	—	—	—	—	—	—	17.0
Stearic	5.0	3.3	2.0	5.4	2.0	2.9	1.0	5.5	4.4	4.2	24.5	—

Coconut oil also contains 10% Capric, 2% Caproic, 9% Caprylic and 45% Lauric. Palm Kernel Oil contains 6% Capric, 3% Caprylic and 50% Lauric. Whale Oil contains 18% Clupandonic.

Comparative Values of Caustic Soda Solutions

% NaOH	% Na_2O	Be 60° F.	Tw. 60° F.	Sp. Gr. 60° F. @ 60° F.	% NaOH	% Na_2O	Be 60° F.	Tw. 60° F.	Sp. Gr. 60° F. @ 60° F.
1	.77	1.6	2.2	1.011	26	20.18	32.4	57.6	1.288
2	1.55	3.1	4.4	1.022	27	20.95	33.4	59.4	1.299
3	2.32	4.6	6.6	1.033	28	21.70	34.3	62.0	1.310
4	3.10	6.3	9.0	1.045	29	22.40	35.2	64.0	1.320
5	3.88	7.7	11.2	1.056	30	23.15	36.1	66.2	1.331
6	4.65	9.1	13.4	1.067	31	24.00	36.9	68.2	1.341
7	5.39	10.5	15.6	1.078	32	24.80	37.8	70.4	1.352
8	6.20	11.9	17.8	1.089	33	25.60	38.6	72.4	1.362
9	6.98	13.2	20.0	1.100	34	26.38	39.4	74.6	1.373
10	7.75	14.5	22.2	1.111	35	27.15	40.2	76.6	1.383
11	8.53	15.8	24.4	1.122	36	27.90	40.9	78.6	1.393
12	9.30	17.1	26.6	1.133	37	28.70	41.7	80.6	1.403
13	10.09	18.3	28.8	1.144	38	29.45	42.4	82.6	1.413
14	10.85	19.5	31.0	1.155	39	30.22	43.1	84.6	1.423
15	11.62	20.7	33.4	1.167	40	31.00	43.8	86.6	1.433
16	12.40	21.9	35.6	1.178	41	31.80	44.5	88.6	1.443
17	13.20	23.1	37.8	1.189	42	32.60	45.2	90.6	1.453
18	13.98	24.2	40.0	1.200	43	33.35	45.9	92.6	1.463
19	14.72	25.2	42.0	1.210	44	34.10	46.5	94.4	1.472
20	15.50	26.3	44.2	1.221	45	34.90	47.1	96.2	1.481
21	16.30	27.4	46.6	1.233	46	35.66	47.8	98.2	1.491
22	17.08	28.5	48.8	1.244	47	36.45	48.4	100.2	1.501
23	17.85	29.5	51.0	1.255	48	37.22	49.0	102.0	1.510
24	18.60	30.5	53.2	1.266	49	37.99	49.6	104.0	1.520
25	19.40	31.5	55.4	1.277	50	38.75	50.2	105.8	1.529

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"Soap and Sanitary Chemicals" Index

Monthly Issues for

Years, 1936, 1937, 1938, 1939 and 1940

	Month	Year	Page
A			
Abrasives	Dec.,	1939	24
Abrasive Hand Soaps	May,	1937	61
Abrasives in Cleaners and Polishes	Apr.,	1938	21
Acid Saponification, Fatty	Apr.,	1937	61
Acid Treatment of Oils	Aug.,	1940	61
Acid Value Methods	Sept.,	1940	65
Acids, Fatty	June,	1937	26
Acids, Fatty, Distillation	May,	1939	57
	Dec.,	1939	31
Acids, Fatty, for the Soap Industry	Aug.,	1939	21
Acids from Pine Wood, Fatty	Mar.,	1937	31
Activated Carbon in Oil and Fat Purification	Aug.,	1937	24
Advertising, Soap	Sept.,	1936	25
Agricultural Insecticides	Apr.,	1937	95
	Mar.,	1940	95
Air Occlusion in Soap	Nov.,	1939	57
Aircraft Insect Problem	Oct.,	1939	99
Alcohols, Higher Fatty	Dec.,	1938	27
	Jan.,	1939	27
	Feb.,	1939	29
	Mar.,	1939	28
Alcohols, Sulfonated Fatty, Patent Situation	May,	1938	27
Alkali Determination	Mar.,	1940	65
Alkali in Soap, How Much?	June,	1938	61
Alkali in Toilet Soap	June,	1936	63
Alkali Silicates	Oct.,	1940	28
	Nov.,	1940	35
Alkali Soaps of Naphthenic Acid	Dec.,	1938	24
All-Purpose Fly Spray Insecticide?	Jan.,	1937	109
Alumina Emulsifiers	July,	1940	63
Ammonia, Household	July,	1937	28
Analysis, Fly Spray	Oct.,	1938	91
Analysis, Insecticide	Feb.,	1939	97
Antiseptics and Disinfectants	Feb.,	1939	111
Antiseptics and Disinfectants, Advances in 1937	Jan.,	1938	107
Antiseptics and Disinfectants, Advances in 1939	Mar.,	1940	109
Antiseptics, Disinfectants and	Jan.,	1937	104
Antiseptics, Phenol Coefficient of	Jan.,	1937	112-e
Antiseptic Soaps	Feb.,	1939	59
Antiseptic Testing	June,	1936	109
	Oct.,	1936	96
Athlete's Foot Control	May,	1940	111
Athlete's Foot Prophylaxis	Feb.,	1940	88
Auto Polish	Sept.,	1936	98
Automobile Polishes	May,	1937	101
	Apr.,	1940	94
Autoxidation of Fats	Jan.,	1940	58
B			
Babassu Oil	Sept.,	1936	28
Bailey Amendment, Congress Adopts	July,	1936	43
Bath Salts, Is the Market Dead?	Apr.,	1937	25
Bed Bug Control, European Methods of	Nov.,	1936	111
Bedbug Control, Pros and Cons	Oct.,	1939	90
Bedbug Liquid, Specifications	May,	1940	115
Bentonite	Oct.,	1938	24
Bentonite in Paste Soap	Jan.,	1940	60
Bid, Unfair Invitations	Aug.,	1939	91
Biological Factors in Peet-Grady Results	May,	1938	103
Bleach Laundry	July,	1937	24
Bleaching, Chemical Oil	Sept.,	1938	61
Bleaching, Fat	Jul.,	1938	61
Bleaching, Fat and Oil	Aug.,	1939	57
Bleaching Fats with Peroxide	Feb.,	1937	65
Bleaching Fatty Oils, Heat	May,	1939	23
Bleaching Olive Oil Foot Soap	Sept.,	1939	25
Bleaching of Palm Oil	Aug.,	1938	57
Bleaching in the Soap Plant	June,	1938	24
Bleaching with Carbon, Oil	Jan.,	1940	61
Blocked Pipe Lines	Jan.,	1940	25
Boiling, Toilet Soap	Apr.,	1939	59
Brewery Cleaning Compounds	Jan.,	1938	26
British Soap Mill Practice	May,	1936	65
Builders, Soap	Oct.,	1939	21
Building Maintenance, Economy in	July,	1940	119
Built Soaps	Nov.,	1937	61
Business and Politics, Can They Be Mixed?	July,	1938	94
Buy Soap, How to	Mar.,	1936	27
Buyer Views Your Salesman	Sept.,	1938	29
Buying Habits, Soap	May,	1938	24
	May,	1939	33
	May,	1940	29
C			
Cake Hand Soaps	Oct.,	1939	57
California Insecticide Act, Explain Labeling Regulations	May,	1937	119
California Labeling of Insecticides	Feb.,	1938	94
California Rules on Insecticide Labeling	Sept.,	1937	125
California's Insecticide Law	Jan.,	1937	113
Camphor and Camphor Oil	May,	1940	32
Cans, Packaging Fly-Sprays in	Feb.,	1937	94
Carbonyl Number	Jan.,	1940	70
Carnauba Prices	June,	1940	127
Carnauba Wax	Aug.,	1939	111
	Nov.,	1939	105
Cartoned or Wrapped? Toilet Soaps	Dec.,	1940	29
Catalysis in Soap Manufacture	Mar.,	1936	63
Cattle Sprays, Composition and Application	Aug.,	1938	103
Cattle Spray Tests	Apr.,	1936	97
	July,	1936	117
Caustic Potash	Feb.,	1940	117
Caustic Soda, Warning	Oct.,	1938	27
Caustic, Unloading Liquid	May,	1939	31
Cedar, What Type Odor?	Aug.,	1938	27
Cellulose, Methyl, in Soap	Jul.,	1939	57

	Month	Year	Page
Chemistry in Pest Control	Nov.,	1939	93
Chinawood Oil	Feb.,	1940	121
Chlorine Disinfectants	Feb.,	1936	103
Chlorophyll in Fat Spoilage	Sept.,	1940	64
Chlorophyll in Tallow	Feb.,	1935	59
Citronella	July,	1936	26
Citronella, Ceylon	Sept.,	1940	31
	Oct.,	1940	32
Clarification, Liquid Soap	Oct.,	1936	68
Cleaners and Polishes, Abrasive in	Apr.,	1938	21
Cleaners, Garage	June,	1938	21
Cleaners, Glass	Nov.,	1940	27
Cleaners, Household	Aug.,	1937	20
Cleaners, Rug, Upholstery	Apr.,	1940	30
Cleaners, White Shoe	Nov.,	1937	26
	Apr.,	1939	92
	May,	1939	107
Cleaners, Windshield and Glass	Jan.,	1938	23
Cleaning Compounds in the Brewery	Jan.,	1938	26
Cleaning Compound Market	Sept.,	1938	21
Cleaning Up Fatty Oils	Jul.,	1939	30
Coal Tar Disinfectants, Uses for	July,	1936	107
Coal Tar Disinfectants for Fruit Tree Spraying	July,	1937	102
Coconut Oil	Feb.,	1940	121
Coconut Oil, Are Present Prices Too High?	May,	1937	32
Coconut Oil Composition	Jan.,	1940	61
Coconut Oil Situation	May,	1938	33
Coconut Oil Tax, The	Feb.,	1936	23
Coconut Shampoo, Modified	Mar.,	1938	63
Cold-Made Soaps	Aug.,	1936	23
Cold Process Soaps	Jan.,	1940	21
	Feb.,	1940	30
Cold Sterilization	Mar.,	1939	103
Colgate Clock, The	Nov.,	1937	37
Coloring, Soap	May,	1940	61
Consumer Preferences in Soap Products	May,	1937	25
Consumption of Soap Kettle Fats	Jul.,	1939	21
Continuous Soap Manufacture	July,	1938	21
	Feb.,	1936	65
	May,	1940	25
Control of Bedbugs, Pros and Cons	Oct.,	1939	90
Control, Mosquito	May,	1939	94
Control, Pest, Chemistry in	Nov.,	1939	93
Convertors, Liquid Soap	May,	1936	39
Cooling Soap	Dec.,	1938	21
Copper Naphthenate	Nov.,	1938	86
Cosmetic Effects in Soap	Sept.,	1937	23
Costs, Potash Soap Prices and	Feb.,	1937	25
Costs, Soap Plant	July,	1940	28
	Aug.,	1940	33
Cracking of Toilet Soaps	Feb.,	1938	26
Cracking, Caused by Plodding	May,	1940	67
Crawling Insects, Tests on	Sept.,	1939	93
Cresylic Acids, Petroleum	Jan.,	1940	97
Cuban Disinfectant Situation	Sept.,	1936	119
Cube versus Derris	Jan.,	1938	111

D

	Month	Year	Page
Dairy Market for Sanitary Chemicals	June,	1938	104
Dairy Plants, Janitor Supplies for	Mar.,	1940	30
Daisy, Pyrethrins in the	Aug.,	1936	109
Darkening of Soap	Aug.,	1940	63
Dealer and Insecticides	May,	1939	97
Deguelin in Derris	Mar.,	1940	107
Dentifrices, What Soap for	Sept.,	1937	19
Deodorants and Disinfectants	Mar.,	1938	104
Deodorized Insecticide Oils, The Case for	Sept.,	1939	109
Derris	Dec.,	1938	117
Derris Stability	May,	1939	103
Derris versus Cube	June,	1936	113
	Jan.,	1938	111
Detergency, Increasing Dry Cleaning	Feb.,	1937	67
Detergency, Wetting Agents and	May,	1937	63
Detergent Efficiency	June,	1937	63
	Jan.,	1940	69
Detergents as Disinfectants	Dec.,	1940	62
Detergent, Sulfonate	Feb.,	1939	60
Detergents Germicidal	Sept.,	1937	27
Detergents in Modern Laundry Practice	Nov.,	1937	30
	Dec.,	1937	27
Detergents, Newer	Dec.,	1938	30
Detergents, Notes on the Non-Soap	Aug.,	1937	17
Detergents, Raw Materials for	Oct.,	1938	21
	Nov.,	1938	29
Detergents, Synthetic	Feb.,	1938	32
	Mar.,	1938	30
	Apr.,	1938	32
	May,	1940	35
Detergents, Textile	May,	1936	23
Detergents vs. Soap, New	Feb.,	1936	67
Dips and Disinfectants	July,	1936	105
Discoloration, Soap	Mar.,	1939	21
	Dec.,	1940	61
Dish Washing	Oct.,	1940	25
Dishwashing Preparations	Oct.,	1936	25
Disinfectant Field, Recent Developments in the	July,	1937	103
Disinfectant Ignorance	Mar.,	1936	92
Disinfectant Labeling	July,	1940	109
Disinfectant Literature and Patents	Jan.,	1938	121
Disinfectant Patents	Nov.,	1937	94
Disinfectant Recommendations	Feb.,	1936	115
Disinfectant Situation Deplorable	Sept.,	1936	119
Disinfectant Specifications	Oct.,	1935	101
	Feb.,	1940	90
	Aug.,	1940	101
Disinfectant Standards	July,	1936	102
Disinfectants, A Supplementary Test for	Nov.,	1936	104
Disinfectants, Advances in 1935	Jan.,	1936	95
Disinfectants and Antiseptics	Jan.,	1937	104
	Feb.,	1939	111
Disinfectants and Antiseptics	Jan.,	1937	104
Disinfectants and Antiseptics, Advances in 1937	Jan.,	1938	107
Disinfectants and Antiseptics, Advances in 1939	Mar.,	1940	109
Disinfectants and Antiseptics, Advances in 1940	Dec.,	1940	104
Disinfectants and Deodorants	Mar.,	1938	101
Disinfectants and Dips	July,	1936	105
Disinfectants, Chlorine	Feb.,	1936	103
Disinfectants, Coal Tar for Fruit Tree Spraying	July	1937	102
Disinfectants, Commercial	Apr.,	1936	95
Disinfectants, Extended Uses for Coal-Tar	July,	1936	107
Disinfectants, Fortifying Agents in	Jan.,	1937	112-a
Disinfectants, Healthful Dissatisfaction in	Jan.,	1936	94c
Disinfectants, High Coefficient	Sept.,	1934	91
	Oct.,	1936	127

	Month	Year	Page
Disinfectants in the Tannery	Oct.,	1940	95
Disinfectants, Pine Oil	Feb.,	1938	107
Disinfectants and Sanitation	Feb.,	1936	111
Disney Puts Soap in Movies	Dec.,	1937	34
Dispensers, Liquid Soap	Aug.,	1936	31
	Sept.,	1936	32
	Oct.,	1936	33
	June,	1937	21
Dispensers, Soap	Aug.,	1940	25
Dispersing Agents for Lime Soaps	Jan.,	1935	55
Distillation, Fatty Acid	May,	1939	57
	Dec.,	1939	31
Dog Soaps	Nov.,	1936	33
Dosage Mortality in Peet-Grady Method	Feb.,	1938	99
Drip Machines	Feb.,	1939	90
	Mar.,	1939	93
Drug Law, Does It Apply?	Jul.,	1939	99
Dry Cleaning Detergents, Increasing	Feb.,	1937	67
Dry Cleaning Soaps	May,	1936	31
Dry Cleaning Soaps and Solvents	Jan.,	1936	25
Dry Mixing, Comments on	Apr.,	1940	92

E

Emulsifying Agent	Jan.,	1940	60
Emulsion Floor Waxes	Jan.,	1936	109
	Jan.,	1940	111
Emulsions, Naphthenic Soap	Nov.,	1937	109
Emulsions, Soap Stabilized	May,	1935	69
English Market, Fly Sprays and Other Insecticides on the	Mar.,	1937	109
Excise Tax Suits	Nov.,	1936	47
Exporting Insecticides	Aug.,	1940	97
Extermination, Science or Racket	Dec.,	1936	133

F

Fair Trade Laws	July,	1937	106
Farm as a Market for Insecticides	Aug.,	1938	95
	Sept.,	1937	29
Farm Soap Market	Sept.,	1939	29
	Dec.,	1939	57
Fat and Oil Bleaching	Aug.,	1939	57
Fat and Oil Consumption, Soap, 1939	Apr.,	1940	41
Fat and Oil Outlook	Aug.,	1938	29
Fat and Oil Refining, the Trend in	Mar.,	1940	23
	Apr.,	1940	27
Fat and Oil Taxes	Aug.,	1936	28
Fat Bleaching	July,	1938	61
Fat Consumption in 1935	May,	1936	37
Fat Consumption Trend, Soap	July,	1940	34
Fat Situation, The	Jan.,	1937	34
Fat Splitting, Factors in	Jan.,	1940	59
Fats, Autoxidation of	Jan.,	1940	58
Fats, Dark, Treating for Soap	Mar.,	1939	57
Fats for the Soap Kettle, New	Feb.,	1937	28
Fats, Hydrogenated Soap	Dec.,	1937	23
Fats and Oils, Review of World Situation	June,	1939	27
Fats in 1936, Soap	May,	1937	23
Fats, Trend in Soap Kettle Consumption	Jul.,	1939	21
Fats, Synthetic	Feb.,	1940	61
Fats, Bleaching with Peroxide	Feb.,	1937	65
Fatty Acid Determination	May,	1940	62
Fatty Acid Distillation	May,	1939	57
	Dec.,	1939	31
Fatty Acid in Soap	Apr.,	1936	65
Fatty Acid Saponification	Apr.,	1937	61
Fatty Acid Separation	Dec.,	1940	62
Fatty Acid Soaps	Feb.,	1940	59
Fatty Acids	June,	1937	26
Fatty Acids from Pine Wood	Mar.,	1937	31
Fatty Acids for the Soap Industry	Aug.,	1939	21
Fatty Acids, Paraffin	Jan.,	1940	61
Fatty Acids, Synthetic	Aug.,	1940	29
	Sept.,	1940	34
	Feb.,	1940	59
Fatty Alcohols, Higher	Dec.,	1938	27
	Jan.,	1939	27
	Feb.,	1939	29
	Mar.,	1939	28
Fatty Oils, Cleaning Up	Jul.,	1939	30
Fatty Oils, Heat Bleaching	Feb.,	1939	23
Fatty Oils, Neutralization of	Jan.,	1940	58
Filled Soaps	Nov.,	1937	61
Filling and Handling Liquids	Aug.,	1939	24
Fire Protection	Aug.,	1940	105
Fish Oil Hydrogenation	Dec.,	1940	67
Fish Oils, Refining	Mar.,	1940	63
Flake Soaps	Aug.,	1936	63
	Apr.,	1938	61
Flakes and Fibers, Soap	Mar.,	1937	65
Flakes, Polished Soap	Jan.,	1937	25
Flies, Moribund	May,	1940	98
Flood, Soap Plants Damaged by	Feb.,	1937	43
Floor Cleaning	Sept.,	1940	27
Floor Finishes, Non-Wax	Nov.,	1939	90
	Dec.,	1939	109
Floor Maintenance, Maple	Aug.,	1939	93
Floor Seal Tests	Dec.,	1938	121
Floor Sealers	Sept.,	1938	91
Floor Wax Makers Form New Association	June,	1937	141
Floor Wax Specifications	May,	1938	99
	Mar.,	1939	90
Floor Wax Testing	Aug.,	1939	99
Floor Wax, Trends in	Apr.,	1938	103
Floor Wax, Water Emulsion, Analysis	Dec.,	1940	119
Floor Waxes, Emulsion	Jan.,	1936	109
	Dec.,	1936	121
	Jan.,	1940	111
Fly Control for Livestock	July,	1938	101
	Aug.,	1938	91
Fly Mortality Data	Aug.,	1937	89
Fly Spray, All-Purpose Insecticide	Jan.,	1937	109
Fly Spray Analysis	Oct.,	1938	91
Fly Spray Labels	May,	1936	95
Fly Spray Odor, What?	Oct.,	1937	109
Fly Spray Testing	June,	1936	125
	June,	1938	119
Fly Sprays for Animals	Feb.,	1936	93
Fly Sprays and Other Insecticides on the English Market	Mar.,	1937	109
Fly Sprays, Effect of Metals on	Jan.,	1936	105
Fly Sprays, Home Made	Jan.,	1939	93
Fly Sprays, Knockdown in	Sept.,	1938	101
Fly Sprays, Packaging in Cans	Feb.,	1937	94
Fly Sprays, Testing of Semi-Concentrate	Sept.,	1937	88
Fluorides	Sept.,	1937	111
Foam Bath Products	Sept.,	1937	41
Foodstuffs Plants, Janitor Supplies for	Jan.,	1940	27
	Feb.,	1940	23
Fortifying Agents in Disinfectants	Jan.,	1937	112-a
Free Alkali in Soap, How Much?	June,	1938	61
Fruit Tree Spraying, Coal Tar Disinfectant for	July,	1937	102
Fuller's Earth, Action of	Jan.,	1940	58
Fur Farming, Sanitation in	Feb.,	1939	93

	Month	Year	Page
Furniture Polish	Apr.,	1936	30
	June,	1940	108

G

Garage Cleaners	June,	1938	21
Gardenia. So What of	Oct.,	1936	37
Gauge Set-ups, Tank	Aug.,	1937	55
Gelatin in Soap	Feb.,	1940	61
Geranium Oil	Apr.,	1937	31
Geranium, Oil of Rose	Mar.,	1938	26
	Apr.,	1938	28
	May,	1938	28
	June,	1938	30
Germ Control in Health Protection, Insect and	Feb.,	1937	99
Germany's Soap	Mar.,	1939	24
Germicidal Action of Some Soaps	June,	1937	115
Germicidal Power of Oil Sprays	Apr.,	1937	90
Germicide Testing	Oct.,	1940	99
Germicides, Evaluation of	Apr.,	1939	97
Germicides, Summary of Patents for Insecticides and	Mar.,	1937	94
Gift Soaps	July,	1937	21
Glass Cleaners	Nov.,	1940	27
Glycerine	Apr.,	1934	17
	Jan.,	1939	21
Glycerine Distillation	Jan.,	1940	61
Glycerine Outlook	July,	1940	32
Glycerine Recovery Costs	Nov.,	1938	21
Glycerine Shortage	Dec.,	1936	25
Glycerine Situation	May.,	1937	21
Glycerine Soaps	Mar.,	1936	67
Glycerine, Twitchell	Sept.,	1938	59
Glycerine, What Future for	Feb.,	1936	25
Glycol and Glycerol Determinations	Sept.,	1940	65
Government Loans, New Equipment via	Aug.,	1938	25
Grape-seed Oil	May,	1940	65

H

Hand Cleaners, Soapless	Jan.,	1940	60
Hand Insecticide Sprayer, Performance of	Jan.,	1940	93
Hand Paste Soaps	Aug.,	1938	19
Hand Soap, Powdered	June,	1940	25
Hand Soaps, Abrasive	May,	1937	61
Hand Soaps, Cake	Oct.,	1939	57
Handling and Filling Liquids	Aug.,	1939	24
Hardwater and Soap Sales	Feb.,	1936	31
Hard-water Soaps	Oct.,	1940	65
Hardwater Soap Sales	Apr.,	1936	23
"Health Soap" Decision, Affirm	Jan.,	1937	45
Higher Fatty Alcohols	Jan.,	1939	27
Homemade Insect Sprays	Mar.,	1938	98
Hotel Market for Sanitation Products	Aug.,	1937	119
Hotel Sanitation and Insect Control	Jan.,	1938	115
Houseflies, Rearing of	Dec.,	1937	115
	Nov.,	1938	109
Housefly Breeding	Oct.,	1938	89
Hydrocarbon Soaps	May,	1940	63
Hydrogenated Oils in Soaps	Mar.,	1939	59
Hydrogenated Soap Fats	Dec.,	1937	23
Hydrogenation, Notes on	Jan.,	1940	63
Hydrogenation, Soybean Oil	Jan.,	1940	61
Hypochlorite Advertising Claims	Aug.,	1937	84
Hypochlorite Claims, Attack	July,	1936	129

I

Industrial Soaps	Nov.,	1939	27
Inhibitors, Phosphates as	Oct.,	1940	63
Insect Aircraft Problem	Oct.,	1939	99
Insect and Germ Control in Health Protection	Feb.,	1937	99
Insect Control Aloft	June,	1940	141
Insect Control, Rotenone in Household	June,	1937	125
Insect Olfactory Responses	Dec.,	1939	123
Insect Repellents	June,	1939	103
Insect Sprays, High Kill	Sept.,	1937	93
Insect Sprays, Homemade	Mar.,	1938	98
Insect Sprays, Household	June,	1940	104
Insect Sprays, Pyrethrum	Jan.,	1940	115
Insects Crawling, Tests on	Sept.,	1939	93
Insects Crawling, On Testing Liquid Insecticides Against	June,	1937	121
Insecticide, Agricultural	Mar.,	1940	95
Insecticide, All-Purpose Fly Spray	Jan.,	1937	109
Insecticide Analysis	Feb.,	1939	97
Insecticide Analysis	Feb.,	1940	99
Insecticide Analyses	Mar.,	1940	133
Insecticide Buying	June,	1936	125
Insecticide Compound, New	June,	1938	133
Insecticide Contest, Winners in	June,	1937	143
Insecticide and Disinfectant Legislative Situation	June,	1939	100
Insecticide Dispersion	June,	1940	121
Insecticide Dusts, Loss of	Jan.,	1940	133
Insecticide and Germicide Patents	Aug.,	1936	92
	Sept.,	1936	102
Insecticide Labeling	Dec.,	1938	111
	Feb.,	1940	93
	July,	1940	105
Insecticide Law, California's	Jan.,	1937	113
Insecticide Literature and Patents	June,	1938	127
	Jan.,	1938	117
Insecticide Marketing	Jul.,	1938	105
	Jan.,	1939	109
Insecticide, New Synthetic	Feb.,	1938	109
Insecticide Odors, Evaluating	Oct.,	1940	106
Insecticide Oils, Deodorized	Sept.,	1939	109
Insecticide Patents	Nov.,	1937	94
	Jan.,	1939	105
Insecticide Powder Labeling	Mar.,	1940	123
	Apr.,	1940	97
Insecticide Progress in 1937	Jan.,	1938	125
Insecticide Research	Nov.,	1940	105
Insecticide Sales Problems	July,	1937	117
Insecticide Sales, Up or Down	Mar.,	1936	107
Insecticide Specification, Buyer Looks at	Mar.,	1938	111
	Apr.,	1938	109
Insecticide Specification, Cincinnati	Apr.,	1936	113
Insecticide Specification, Debate	Jan.,	1936	93
Insecticide Specifications	Apr.,	1936	111
Insecticide Specifications at 23rd Annual I & D Convention, New	Jan.,	1937	95
Insecticide Specifications for Crawling Insects	Nov.,	1937	101
Insecticide Specifications, Liquid	Jan.,	1936	94d
	Jan.,	1937	119
Insecticide Specifications, Veterans'	May,	1936	109
Insecticide Sprayers, Hand	Jan.,	1940	93
Insecticide Staining	Mar.,	1940	101
Insecticide Standards	July,	1936	103
	Aug.,	1937	107

	Month	Year	Page
Insecticide, Testing Methods Need for Specialized	July,	1937	101
Insecticide Tests Compared	Sept.,	1936	96
Insecticide Tests on Roaches	Oct.,	1937	94
Insecticide Tests on Wild Flies	Mar.,	1938	107
Insecticides, A Resume of	Feb.,	1936	97
Insecticides Act California, Explain Labeling Regulations Under	May,	1937	119
Insecticides, Agricultural	Apr.,	1937	95
Insecticides and Germicides, Summary of Patents for	Mar.,	1937	94
Insecticides, Better Through Research	July,	1937	97
Insecticides, Consumer Sales Education on	July,	1937	115
Insecticides and the Dealer	May,	1939	97
Insecticides on the English Market, Fly Sprays and Other	Mar.,	1937	109
Insecticides, Evaluating Liquid	Oct.,	1937	103
Insecticides, Exporting	Aug.,	1940	97
Insecticides, Farm as a Market	Aug.,	1938	95
Insecticides, Horizons Beyond	Aug.,	1936	103
Insecticides, Labeling in California	Feb.,	1938	94
Insecticides, Labeling of	Jan.,	1937	98
Insecticides Liquid, on Testing Against Crawling Insects	June,	1937	121
Insecticides Liquid, What Odor?	May,	1937	90
Insecticides, Resistance to	Aug.,	1939	88
Insecticides, Synthetic	Oct.,	1938	97
Insecticides, Testing	Jan.,	1937	119
Insecticides, What's Ahead In	Jan.,	1936	94b
Insecticides, What Does Housewife Want to Know?	Jul.,	1939	95
Insurance, Products Liability	Feb.,	1939	103
Iodine No. with Bromine	Aug.,	1940	73
Iron Contamination	Apr.,	1940	63
Irritation of Soap on the Skin	Dec.,	1940	23

J

Jabon Cochi	July,	1937	33
Janitor Supplies	Apr.,	1938	24
Janitor Supplies—A Racket	May,	1936	92
Janitor Supplies for Dairy Plants	Mar.,	1940	30
Janitor Supplies for Foodstuffs Plants	Jan.,	1940	27
	Feb.,	1940	23
Japan's Soap	June,	1938	27

K

Kenya, Perfume Oils of	Jan.,	1939	30
	Feb.,	1939	26
Ketone Rancidity, Testing	Feb.,	1940	58
Kettle, At the Soap	Sept.,	1937	26
Kettle Design, Soap	Oct.,	1940	61
Knockdown in Fly Sprays	Sept.,	1938	101
Knock-Down on Flies	Mar.,	1940	99
Knock-Down on Flies, Fractional	Nov.,	1940	101

L

Label Claims	Jul.,	1939	103
Label Taboos, F.T.C.	May,	1940	105
Labeling, California Rules on Insecticide	Sept.,	1937	125
Labeling Disinfectant	July,	1940	109
Labeling, Insecticide	Mar.,	1937	98
	Dec.,	1938	111
	Feb.,	1940	93
Labeling Insecticides	July,	1940	105
Labeling, Insect Powder	Mar.,	1940	123
	Apr.,	1940	97
Labeling of Insecticides in California	Feb.,	1938	94
Labeling Regulations Under California Insecticide Act, Explain	May,	1937	119
Labels, Fly Spray	May,	1936	95
Lamepons	May,	1940	35
Lamepons, American	Feb.,	1940	41
Laundry Bleach	July,	1937	24
Laundry Soaps	Oct.,	1937	27
Laundry Sours	June,	1937	31
	July,	1940	62
Laundry Specifications	Oct.,	1938	28
	Nov.,	1938	26B
Lavandin	Nov.,	1936	25
	Dec.,	1936	34
Lavender Oil	Feb.,	1936	17
Law, Drug, Does It Apply?	Jul.,	1939	99
Legislation, Current	June,	1936	113
	July,	1938	107
Legislation, Federal	Feb.,	1937	111
Legislation, Recent	June,	1937	111
Legislative Outlook for 1939	Dec.,	1938	105
Legislative Situation, Insecticide and Disinfectant	June,	1939	100
Lemongrass, Oil of	Jul.,	1939	26
	Aug.,	1939	28
Leverhulme, Viscount; What Future for Soap?	Feb.,	1938	23
Liability Insurance, Products	Feb.,	1939	103
Linseed Oil Analysis	Jan.,	1940	61
Linseed Oil-Potash Soap, New U. S. Specification Proposed for	Apr.,	1937	44
Liquid Caustic, Unloading	May,	1939	31
Liquid Insecticide Specification	Jan.,	1937	119
Liquid Insecticides, On Testing Against Crawling Insects	June,	1937	121
Liquid Insecticides, What Odor For?	May,	1937	90
Liquid Shampoos	Oct.,	1937	23
Liquid Shampoos, Sidelights on	Nov.,	1939	21
Liquid Soap Clarification	Oct.,	1936	68
Liquid Soap Convertor	May,	1936	39
Liquid Soap Dispensers	Aug.,	1936	31
	Sept.,	1936	32
	Oct.,	1936	33
	June,	1937	21
Liquid Soap Manufacture	Dec.,	1936	65
	June,	1939	57
Liquid Soap Specialties	Dec.,	1937	61
Liquid Waxes, Paste and	Mar.,	1937	99
Liquids, Handling and Filling	Aug.,	1939	24
Livestock, Fly Control	Jul.,	1938	101
	Aug.,	1938	91
Livestock Sprays	July,	1940	96
	Nov.,	1940	92
	Dec.,	1940	111
Louse Control	Sept.,	1940	105
Low Grade Soap Fats	Aug.,	1939	61

M

Maple Floor Maintenance	Aug.,	1939	93
Market, Farm Soap	Dec.,	1939	27
Marketing, Insecticide	Jan.,	1939	109
Marketing Problems, Insecticides	July,	1938	105
Mechanics' Hand Soap	Aug.,	1938	19

	Month	Year	Page
Medicated Soaps	Oct.,	1936	29
	July,	1937	61
	Mar.,	1938	61
Metal Polishes	May,	1936	29
	Sept.,	1939	90
	Oct.,	1939	103
Metallic Soaps	Nov.,	1936	36
	Dec.,	1936	31
Metaphosphate in Laundering	Nov.,	1940	67
Metaphosphate Solutions	Mar.,	1936	66
Methods, Test, for Recording Moribund Kill	Nov.	1939	99
Methyl Cellulose in Soap	Jul.,	1939	57
Military Sanitation	Dec.,	1940	100
Mill Practice, British Soap	May,	1936	65
Milled Toilet Soap, Set-up Specification for	May,	1937	31
Milled Toilet Soaps	June,	1936	27
Modified Soaps	June,	1940	62
Moisture Tests	June,	1940	63
Moribund Kill	Oct.,	1939	93
Moribund Kill, Test Methods for Recording	Nov.,	1939	99
Morpholine in Wax Polishes, Comments on	Aug.,	1938	99
Mortality Dosage in Peet-Grady Method	Feb.,	1938	99
Mosquito Control	May,	1939	94
Moth Control	Aug.,	1936	100
Moth Guarantees, Criticize	Apr.,	1936	109
Moth Proofing Problems	Jan.,	1938	103
Mothproofing Test	Oct.,	1940	97
Mothproof Test Revised	Dec.,	1940	117
Moth Specialties	Apr.,	1938	99
Moth Sprays	Mar.,	1936	95
Moths, Information and Misinformation	Aug.,	1936	107
Mustardseed Oil	Jan.,	1940	58

N

Naphthenic Acid, Alkali Soaps of	Dec.,	1938	24
Naphthenic Soap Emulsions	Nov.,	1937	109
New Uses for Soap	June,	1939	24
Non-Wax Floor Finishes	Nov.,	1939	90
	Dec.,	1939	109
No-Rub Wax Case, Discuss	Dec.,	1936	147
No-Rub Wax Case, File Law Suit In	Nov.,	1936	121
No-Rub Wax, Warn on	Oct.,	1936	125

O

Odor, What Fly Spray?	Oct.,	1937	109
Odor, What for Liquid Insecticides?	May,	1937	90
Odor, What Type for Cedar?	Aug.,	1938	27
Odors, Evaluating Insecticide Odors	Oct.,	1940	106
Office Building Sanitation	Jan.,	1939	99
Oil and Fat Bleaching	Aug.,	1939	57
Oil and Fat Consumption in 1935	May,	1936	37
Oil and Fat Consumption, Soap, 1932-1939	Apr.,	1940	43
Oil and Fat Outlook	Sept.,	1937	29
	Aug.,	1938	29
Oil and Fat Purification, Activated Carbon in	Aug.,	1937	24
Oil and Fat Refining, The Trend in	Mar.,	1940	23
	Apr.,	1940	27
Oil and Fat Taxes	Aug.,	1936	28
Oil Bleaching with Carbon	Jan.,	1940	61
Oil, Geranium	Apr.,	1937	31
	Mar.,	1938	26
	Apr.,	1938	28
	May,	1938	28
	June,	1938	30
Oil, Lemongrass	Jul.,	1939	26
	Aug.,	1939	28
Oil Markets, War Hits	June,	1940	35
Oil Refining, Continuous	Sept.,	1938	25
Oil Refining Methods	Nov.,	1940	75
Oil Refining Test	Sept.,	1940	63
Oils, Fatty, Cleaning Up	Jul.,	1939	30
Oils, Fatty, Heat Bleaching of	Feb.,	1939	23
Oils and Fats, World Situation	June,	1939	27
Oils, Hydrogenated, in Soap	Mar.,	1939	59
Oils, Perfume, Kenya	Jan.,	1939	30
	Feb.,	1939	26
Old-Time Soaps, Comments on	Aug.,	1940	71
Olfactory Responses, Insect	Dec.,	1939	123
Olive Foots Soaps, Bleaching	Sept.,	1939	25
Oxygen Soap Powders	Jan.,	1936	65
	Sept.,	1939	59

P

Packaging Toilet Soaps	Apr.,	1939	26
Package Redesign	Nov.,	1939	24
Packages, Shampoo	Feb.,	1937	33
Packaging Fly Sprays in Cans	Feb.,	1937	94
Packaging, Foreign Soap	Mar.,	1936	31
Palm Oil	Nov.,	1940	31
Palm Oil Bleaching	Aug.,	1938	57
Palm Oil Soap	June,	1940	65
Palm Oils	Feb.,	1936	26
Paraffin Fatty Acids	Apr.,	1940	63
Paste and Liquid Waxes	Mar.,	1937	99
Patent Situation in Sulfated Fatty Alcohols	May,	1938	27
Patents and Literature on Insecticides	June,	1938	127
Patents, Disinfectant and Insecticide	Nov.,	1937	94
Patents, Insecticide	Jan.,	1939	105
Patents for Insecticides and Germicides, Summary of	Mar.,	1937	94
Patents Reviewed, Insecticide and Germicide	Aug.,	1936	92
	Sept.,	1936	102
Patman Act, A & P Attacks	Mar.,	1937	46
Peet-Grady Method, Biological Factors in Results	May,	1938	103
Peet-Grady Method, Dosage Mortality	Feb.,	1938	99
Peet-Grady Method, Error in	June,	1940	111
Peet-Grady Method Modified, Greater Speed and Accuracy	May,	1938	115
Peet-Grady Results, A Method for Standardizing	June,	1937	116
Peet-Grady Test, Comments on the	Jan.,	1937	110
Peptization of Soap Solutions	July,	1937	63
Peptone, New Standard	Feb.,	1938	125
Perfume Oils of Kenya	Jan.,	1939	30
	Feb.,	1939	26
Perfumes, Soap; Low Cost	May,	1938	21
Perfuming Materials	Dec.,	1939	28
Perfuming Soap	Dec.,	1937	65
Pest Control, Chemistry in	Nov.,	1939	93
Petroleum Cresylic Acids	Jan.,	1940	97
pH, Its Meaning and Use	July,	1938	25
	Aug.,	1938	22
	Sept.,	1938	28
Phenol Coefficient, The	Jan.,	1936	101

	Month	Year	Page
Phenol Coefficient of Antiseptics?	Jan.,	1937	112-e
Phosphate Determination	May,	1940	71
Phosphates	Jan.,	1939	24
Phosphates as Inhibitors	Oct.,	1940	63
Pine Oil Disinfectants	Oct.,	1936	127
	Feb.,	1938	107
Pine Wood, Fatty Acids From	Mar.,	1937	31
Pipe Lines, Blocked	Jan.,	1940	25
Polish, Auto	Sept.,	1936	98
Polished Soap Flakes	Jan.,	1937	25
Polishes, Automobile	May,	1937	101
	Apr.,	1940	94
Polishes, Furniture	Apr.,	1936	30
	June,	1940	108
Polishes, Metal	May,	1936	29
	Sept.,	1939	90
	Oct.,	1939	103
Politics and Business, Can They Be Mixed?	July,	1938	94
Potash-Linseed Oil Soap, New U. S. Specification	Apr.,	1937	44
Potash Soaps	Dec.,	1937	31
	Oct.,	1937	61
Potash Soaps for Wood Floors	Oct.,	1938	31
Potash Soaps, A Half Century in	Jan.,	1936	33
Potash Soaps, Prices and Costs	Feb.,	1937	25
	Mar.,	1937	34
Powdered Hand Soaps	June,	1940	25
Powdered Soaps	June,	1937	61
Powders, Soap and Scouring	May,	1937	28
Preservation of Toilet Soaps	Sept.,	1937	57
Preservatives, Soap	Apr.,	1937	21
	July,	1940	63
Preserving Soaps	June,	1936	65
Presses, Modern Soap	Oct.,	1937	30
Prices and Costs, Potash Soaps	Feb.,	1937	25
	Mar.,	1937	34
Prices. Coconut Oil	May,	1937	32
Procter and Gamble, 1837-1937	Apr.,	1937	28
Products Liability Insurance	Feb.,	1939	103
Public Health, The	July,	1936	113
Purchasing Agent Sees the Sanitary Products Industry	July,	1938	111
Purchasing Specifications	Feb.,	1938	96
Pyrethrin Preparation	Nov.,	1938	101
Pyrethrins in the Field Daisy	Aug.,	1936	109
Pyrethrum	Dec.,	1936	116
	Dec.,	1937	107
	Sept.,	1938	86
	Feb.,	1940	109
Pyrethrum Analysis, Some Comments on	Nov.,	1936	99
Pyrethrum Crop at New High	Oct.,	1936	104
Pyrethrum Deterioration	July,	1940	101
Pyrethrum Evaluation	Nov.,	1938	89
Pyrethrum Imports, 1923-1939	Mar.,	1940	129
Pyrethrum Insect Sprays	Jan.,	1940	115
Pyrethrum Labels, New	Aug.,	1940	115
Pyrethrum Outlook, The	Jan.,	1937	101
Pyrethrum Products	Dec.,	1939	115
Pyrophosphate	Apr.,	1940	23

R

	Month	Year	Page
Railroad Market for Sanitary Chemicals	May,	1938	94
Rancidity, Prevention of	Dec.,	1939	21
Rancidity Prevention	Mar.,	1940	72
Raw Material Costs, Soap and the War	Oct.,	1939	28
Raw Material Symposium	Feb.,	1940	105
Recovery Costs, Glycerine	Nov.,	1938	21
Refining, Oil and Fat	Mar.,	1940	23
Refining Oil, Continuous	Sept.,	1938	25
R-P Act, Application of	Sept.,	1936	45
R-P Act, More About the	Oct.,	1936	102
R-P Act, What to Do About	Oct.,	1936	98
R-P Test Cases	Nov.,	1936	123
Repellents, Insect	June,	1939	103
Resistance to Insecticides	Aug.,	1939	88
Restaurant Market for Cleaning Materials	July,	1940	25
Reversed Soaps	Oct.,	1939	25
Rice Bran Oil	Jan.,	1940	70
Roach Powders, Composition	Oct.,	1940	92
	Nov.,	1940	96
Roaches, Insecticide Tests on	Oct.,	1937	94
Roaches, Resistance to Insecticides	June,	1938	109
Roaches, Test Methods on	Aug.,	1938	86
Rose Geranium Oil	Mar.,	1938	26
	Apr.,	1938	28
	May,	1938	28
	June,	1938	30
Rosemary	June,	1936	23
Rosin-Fatty Acid Mixtures	Mar.,	1940	61
Rotenoids	Nov.,	1940	123
Rotenone Determination	Mar.,	1940	107
Rotenone Products	Feb.,	1940	111
Rotenone Series Compounds	Jul.,	1939	107
Rotenone, Determination of	July,	1936	109
Rotenone in Household Insect Control	June,	1937	125
Rotenone Powders	Apr.	1936	107
Rotenone Powders, Toxicity of	Mar.,	1936	109
	June,	1936	117
Rotenone, Toxicity of	Jan.,	1937	112c
Rubber Moulding, Soap in	Apr.,	1940	51
Rug Cleaners	Apr.,	1940	30

S

	Month	Year	Page
Sales Education on Insecticides, Consumer	July,	1937	115
Sales, Hardwater Soap	Apr.,	1936	23
Sales Problems, Insecticide	July,	1937	117
Salt-Water Soaps	Jan.,	1938	61
Sanitary Chemicals, Dairy Market	June,	1938	104
Sanitary Chemicals, Theater Market	July,	1938	96
Sanitary Chemicals, Railroad Market	May,	1938	99
Sanitary Chemicals, Steamship Market	Apr.,	1938	94
Sanitary Code, N. Y. Health Board Amends Section 104 of	June,	1937	151
Sanitary Product Claims Restricted	July,	1937	129
Sanitary Products Industries, As Seen by Purchasing Agent	July,	1938	111
Sanitary Specialties, The Quality Problem in	Feb.,	1936	94
Sanitary Specialties, The Trend in	Feb.,	1937	105
Sanitary Supply Assn. Elects	July,	1936	131
Sanitary Supply Dealer, The	July,	1936	104
Sanitary Supply Salesmen, Training	Feb.,	1936	95
Sanitary Supply Selling	Mar.,	1940	92
	Apr.,	1940	103
Sanitation and Disinfection	Feb.,	1936	111
Sanitation in Fur Farming	Feb.,	1939	93
Sanitation in the Air	Aug.,	1940	90
Sanitation and Insect Control, Hotel	Jan.,	1938	115
Saponification, Fatty Acid	Apr.,	1937	61
Saponification, Soda Ash	Oct.,	1936	65
Saponification, Speeding Up	Dec.,	1939	57
Saponification Value, Wax	Jan.,	1940	58
Sassafras Substitutes	Jan.,	1940	70

	Month	Year	Page
Scouring Powders	Apr.,	1936	63
	June,	1936	32
Scouring Powders, Soap Powders and	May,	1937	29
Selling Soap Is Different	Mar.,	1936	33
Shampoo Composition	Jan.,	1936	67
Shampoo Mixtures	May,	1936	63
Shampoo, Modified Coconut	Mar.,	1938	63
Shampoo Package	Feb.,	1937	33
Shampoo, Which One?	Mar.,	1938	23
Shampoos, Liquid	Oct.,	1937	23
Shampoos, Liquid, Sidelights on	Nov.,	1939	21
Shampoos, Soapless	Jan.,	1937	67
Shampoos, Trend in	Sept.,	1939	26
Shaving Accessories	Jan.,	1937	29
Shaving Creams	Apr.	1936	67
	Nov.,	1936	67
Shaving Preparations	Mar.,	1936	23
	Apr.,	1936	26
Shaving Soap Notes	Feb.,	1938	61
Shaving Soaps	Nov.,	1937	24
Shaving Soaps and Creams	Jan.,	1939	59
Shellac, Comments on	Jan.,	1940	109
Shellac in Wax Polishes	May,	1940	94
Shoe Cleaners, White	Nov.,	1937	26
Silicate Detergents, Sodium	Apr.,	1940	67
Silicates, Alkali	Oct.,	1940	28
	Nov.,	1940	35
Silicate Soaps	Sept.,	1936	65
Silk Degumming, Soaps or Emulsions for	Jan.,	1936	29
Soap Advertising	Sept.,	1936	25
Soap, Air Occlusion in	Nov.,	1939	57
Soap as a Disinfectant	Mar.,	1940	123
Soap Boiling, Comments	Nov.,	1940	63
Soap Boiling, Toilet	Apr.,	1939	59
Soap Builders	Oct.,	1939	21
Soap Buying Habits	May,	1938	24
	Feb.,	1939	23
	May,	1940	29
Soap Coloring	May,	1940	61
Soap Consumption, World	Nov.,	1937	34
Soap, Continuous Manufacture of	July,	1938	21
Soap Converter, Liquid	May,	1936	39
Soap Cooling	Dec.,	1938	21
Soap-Cresol-Water Systems	Jan.,	1940	70
Soap Definitions Revised	Apr.,	1940	59
Soap Discoloration	Mar.,	1939	21
Soap Discoloration, Toilet	Dec.,	1940	61
Soap Dispensers	Aug.,	1940	25
Soap Dispensers, Liquid	Aug.,	1936	31
	Sept.,	1936	32
	Oct.,	1936	33
Soap Emulsions, Naphthenic	Nov.,	1937	109
Soap Executive Speaks	Mar.,	1940	27
Soap Fat Consumption Trend	July,	1940	34
Soap Fats, Low Grade	Aug.,	1939	61
Soap Fats, Hydrogenated	Dec.,	1937	23
Soap Fats in 1936	May,	1937	23
Soap, Fatty Acid in	Apr.,	1936	65
Soap Flake Manufacture	Dec.,	1938	59
Soap Flakes	Aug.,	1936	63
Soap Flakes and Fibers	Mar.,	1937	65
Soap Flakes, Polished	Jan.,	1937	25
Soap, Germany's	Mar.,	1939	24
Soap, How Much Free Alkali?	June,	1938	61
Soap, How to Buy	Mar.,	1936	27
Soap in the Tannery	July,	1936	23
Soap, Japan's	June,	1938	27
Soap Kettle, At the	Sept.,	1937	26
Soap Kettle Design	Oct.,	1940	61
Soap, Liquid, Manufacture	June,	1939	57
Soap Output Rose 20 Per Cent in 1935	Feb.,	1937	45
Soap Manufacture, Catalysis in	Mar.,	1936	63
Soap Manufacture, Continuous	Feb.,	1936	65
Soap Making, Continuous	May,	1940	25
Soap Manufacture, Liquid	Dec.,	1936	65
Soap Manufacture Under War Conditions	Nov.,	1939	31
Soap Market Surveyed	May,	1936	36
Soap, New Detergents Vs.	Feb.,	1936	67
Soap Output, 1939	Dec.,	1940	35
Soap Packaging, Foreign	Mar.,	1936	31
Soap Perfumes, Low Cost	May,	1938	21
Soap Perfuming	Dec.,	1937	65
Soap Phases	June,	1940	31
Soap Plant Bleaching	June,	1938	24
Soap Plant Costs	July,	1940	28
	Aug.,	1940	33
Soap Powders	June,	1937	61
Soap Powders and Scouring Powders	May,	1937	28
	Sept.,	1939	59
Soap Powders, Stable Oxygen	Jan.,	1936	65
Soap Preservatives	Apr.,	1937	21
Soap Presses, Modern	Oct.,	1937	30
Soap Price Advance Lags	Oct.,	1939	27
Soap Products, Consumer Preference in	May,	1937	25
Soap Progress, The Trend of	Jan.,	1940	30
Soap in the Public Prints	Jul.,	1939	23
Soap Raw Material Costs and the War	Oct.,	1939	28
Soap Sales, Hardwater	Apr.,	1936	23
Soap Selling Is Different	Mar.,	1936	33
Soap Solutions, Peptization of	July,	1937	63
Soap Specialties, Liquid	Dec.,	1937	61
Soap Specifications	May,	1939	28
Soap Specifications, Debate	Jan.,	1937	47
Soap Specifications, Soft	Jan.,	1937	65
Soap Stock, Additions to	Nov.,	1936	65
Soap Texture	Apr.,	1939	23
	May,	1939	24
	Jan.,	1940	57
Soap, Toilet, Cracking of	Feb.,	1938	26
Soap Uses	June,	1939	24
Soap Waste, Working Up	Feb.,	1940	57
Soap, What Future for?	Feb.,	1938	23
Soap, Which for Dentifrices?	Sept.,	1937	19
Soapless Hand Cleaner	Jan.,	1940	60
Soapless Shampoos	Jan.,	1937	67
Soaps, Abrasive Hand	May,	1937	61
Soaps, Alkali; of Naphthenic Acid	Dec.,	1938	24
Soaps and Solvents, Dry Cleaning	Jan.,	1936	25
Soaps, Antiseptic	Feb.,	1939	59
Soaps, Cold-Made	Aug.,	1936	23
Soaps, Cold Process	Jan.,	1940	21
	Feb.,	1940	30
Soaps, Cosmetic Effects in	Sept.,	1937	23
Soaps, Dog	Nov.,	1936	33
Soaps, Dry Cleaning	May,	1936	31
Soaps, Fatty Acid	Feb.,	1940	59
Soaps for Farms	Sept.,	1939	29
Soaps, Flake	Apr.,	1938	61
Soaps, Filled and Built	Nov.,	1937	61
Soaps, Germicidal Action of Some	June,	1937	115
Soaps, Gift	July,	1937	21
Soaps, Glycerine	Mar.,	1936	67
Soaps, Hand Cake	Oct.,	1939	57

	Month	Year	Page
Soaps, Hand Paste	Oct.,	1936	29
	July,	1937	61
	Aug.,	1938	19
Soaps, Improving Toilet	July,	1936	30
Soaps, Industrial	Nov.,	1939	27
Soaps, Irritation of	Dec.,	1940	33
Soaps, Laundry	Oct.,	1937	27
Soaps, Medicated	Mar.,	1938	61
Soaps, Metallic	Nov.,	1936	36
	Dec.,	1936	31
Soaps, Milled Transparent	Jan.,	1936	69
Soaps, Modified	June,	1940	62
Soaps, Mottled	Feb.,	1936	69
Soaps or Emulsions for Silk Degumming	Jan.,	1936	29
Soaps, Phenolic	Feb.,	1936	69
Soaps, Potash	Dec.,	1937	31
Soaps, Powdered Hand	June,	1940	25
Soaps, Preserving	June,	1936	65
Soaps, Prices and Costs Potash	Jan.,	1936	33
	Feb.,	1937	25
	Mar.,	1937	34
Soaps, Rapid Dissolving	July,	1940	61
Soaps, Reversed	Oct.,	1939	25
Soaps, Soft-Water	Jan.,	1938	61
Soaps, Silicate	Sept.,	1936	65
Soaps, Silicated	June,	1940	27
Soaps, Solvent	May,	1938	61
Soaps, Soybean Oil	Oct.,	1936	65
Soaps, Specialty Toilet	Mar.,	1937	25
Soaps, Sulfur	Nov.,	1938	59
	Jan.,	1940	58
Soaps, Tall Oil	Mar.,	1940	59
Soaps, Textile	May,	1936	67
	July,	1936	63
Soaps, Toilet	July,	1938	28
Soaps, Transparent	Oct.,	1938	52
Soaps, Triethanolamine	Aug.,	1937	61
Soaps, Vitamin	Nov.,	1936	30
Soaps, Which Sell?	May,	1939	21
Soaps, White	Dec.,	1940	25
Soda Ash Saponification	Oct.,	1936	65
Soft Soap, New Specifications	Dec.,	1938	61
Soft Soap, U. S. P.	Feb.,	1939	21
	May,	1939	27
Soft Soaps, U. S. P.; Proposed Changes	Dec.,	1938	30
Solvent Soaps	May,	1938	61
Sours, Laundry	June,	1937	31
Soybean Oil	Dec.,	1936	27
Soybean Oil Soaps	Oct.,	1936	65
Specialty Toilet Soaps	Mar.,	1937	25
Specification, Cincinnati Insecticide	Apr.,	1936	113
Specification, Debate Insecticide	Jan.,	1936	93
Specification for Liquid Insecticide	Jan.,	1936	94d
Specification, Liquid Insecticide	Jan.,	1937	119
Specification for Milled Toilet Soap	May,	1937	31
Specification, Proposed for Potash-Linseed Oil Soap, New U. S.	Apr.,	1937	44
Specifications, Blames Manufacturers for Faulty	Sept.,	1936	117
Specifications, Debate Soap	Jan.,	1937	47
Specifications, Floor Wax	May,	1938	99
	Mar.,	1939	90
Specifications in Purchasing	Feb.,	1938	96
Specifications, Insecticide	Apr.,	1936	111
	Nov.,	1937	101
	Apr.,	1938	109
	Mar.,	1938	111
Specifications, Laundry	Oct.,	1938	28
	Nov.,	1938	26B
Specifications, Soap	May,	1939	28
Specifications, Soft Soap	Jan.,	1937	65
	Dec.,	1938	61
Specifications, U. S. Treasury Department for Insecticide	Aug.,	1936	119
Specifications, Veterans' Insecticide	May,	1936	109
Spray, Fly, Testing	Apr.,	1939	103
Spray Soap Case, Reverse Decision in	May,	1937	41
Sprayers	Feb.,	1936	96
Sprayers, Hand Insecticide	Jan.,	1940	93
Sprays for Cattle, Composition and Application	Aug.,	1938	103
Sprays, Fly, Home-Made	Jan.,	1939	93
Sprays for Insects, Homemade	Mar.,	1938	98
Sprays, Germicidal Power of Oil	Apr.,	1937	90
Sprays, Livestock	Nov.,	1940	92
	Dec.,	1940	111
Sprays, Stock	Mar.,	1939	99
Stabilization, Soap	Feb.,	1940	21
Standards, Disinfectant	July,	1936	102
Standards, Insecticide	July,	1936	103
Standards or Policing, Which?	Feb.,	1938	105
Standards, What Shall We Do About Them?	July,	1936	100
Staph. Aureus, Culturing	Feb.,	1937	103
Steamship Market for Sanitary Chemicals	Apr.,	1938	94
Sterilization, Cold	Mar.,	1939	103
Stock Sprays	Mar.,	1939	99
Stock Sprays Evaluated	Mar.,	1936	101
Stock-Sprays, Home-Made	Aug.,	1940	93
Stock-Sprays, Standard	Sept.,	1940	92
Sulfated Fatty Alcohols, Patent Situation	May,	1938	27
Sulfonate Detergent	Feb.,	1939	60
Sulfonated Oil Analysis	Jan.,	1940	69
Sulfur Soap	Jan.,	1940	58
Sulfur Soaps	Nov.,	1938	59
Superfatting	Sept.,	1939	21
Superfatting Agents	Sept.,	1937	59
Supplies, Janitor's	Apr.,	1938	24
Sweating of Soap	Dec.,	1940	65
Sweeping Compound	Nov.,	1938	105
Sweet Pea Perfume for Soaps	Jan.,	1940	67
Synthetic Detergents	Feb.,	1938	32
	Mar.,	1938	30
	Apr.,	1938	32
	May,	1940	35
Synthetic Fatty Acids	Aug.,	1940	29
	Sept.,	1940	34
Synthetic Insecticides	Oct.,	1938	97
Synthetic Insecticides, New	Feb.,	1938	109
Synthetic Waxes	Sept.,	1936	105
	Oct.,	1936	105

T

Tall Oil Soaps	Mar.,	1940	59
Tallol Soap, Uses	Apr.,	1940	61
Tank Gauge Set-Ups	Aug.,	1937	55
Tannery, Disinfectants in the	Oct.,	1940	95
Tannery, Soap in the	July,	1936	23
Tar Acids	Feb.,	1940	113
	Mar.,	1940	131
Tariff Revision, 1938 Style	Mar.,	1938	34
Tax, Soapers Fight Boost	Apr.,	1939	32

	Month	Year	Page
Tax Suits, Excise	Nov.,	1936	47
Tax, The Coconut Oil	Feb.,	1936	23
Taxes, Fat and Oil	Aug.,	1936	28
Tephrosia, Toxicity of	Sept.,	1939	111
Termites	Apr.,	1936	92
	Aug.,	1936	98
Termite Control	Apr.,	1937	101
	Apr.,	1940	109
Termite Menace, The	Aug.,	1937	111
Termite Menace, What?	Dec.,	1937	119
Test for Disinfectants, A Supplementary	Nov.,	1936	104
Test Methods for Recording Moribund Kill	Nov.,	1939	99
Test Methods on Roaches	Apr.,	1938	86
Test Methods, Wash	Apr.,	1939	31
Testing, Antiseptic	June,	1936	109
	Oct.,	1936	96
Testing Floor Wax	Jan.,	1939	95
	Aug.,	1939	99
Testing Fly Sprays	June,	1936	105
	June,	1938	119
	Apr.,	1939	103
Testing Insecticides	Jan.,	1937	119
Testing Liquid Insecticides Against Crawling Insects, on	June,	1937	121
Testing Methods, Need for Specialized Insecticide	July,	1937	101
Testing of Semi-concentrate Fly Sprays	Sept.,	1937	88
Tests, Cattle Spray	Apr.,	1936	97
	July,	1936	117
Tests Compared, Insecticide	Sept.,	1936	96
Tests on Crawling Insects	Sept.,	1939	93
Tests, Floor Seal	Dec.,	1938	121
Tests, Insecticide; on Wild Flies	Mar.,	1938	107
Tests on Roaches, Insecticide	Oct.,	1937	94
Tetra-Sodium Pyrophosphate	Nov.,	1938	24
Tetrasodium Pyrophosphate in Soap	Aug.,	1940	74
Textile Detergents	May,	1936	23
Textile Detergents, Phosphate	Jan.,	1940	61
Textile Soaps	May,	1936	67
Texture, Soap	Apr.,	1939	23
	May,	1939	24
Texture, Toilet Soap	Jan.,	1940	57
Thallium Hazards	May,	1937	95
Theater Market for Sanitary Chemicals	July,	1938	96
Thiocyanates, Toxicity of	Feb.,	1937	96
Timbo, Brazilian	Sept.,	1940	99
Tinware Cleaning	Jan.,	1940	60
Titre of Rosin-Fatty Acid Mixtures	Mar.,	1940	61
Toilet Soap, Alkali in	June,	1936	63
Toilet Soap Boiling	Apr.,	1939	59
Toilet Soap Cracking	Feb.,	1938	26
Toilet Soap Discoloration	Dec.,	1940	61
Toilet Soap, Set-up Specifications for Milled	May,	1937	31
Toilet Soap Stock, Additions to	Nov.,	1936	65
Toilet Soap Texture	Jan.,	1940	57
Toilet Soaps	July,	1938	28
Toilet Soaps, Cartoned or Wrapped?	Dec.,	1940	29
Toilet Soaps, Improving	July,	1936	30
Toilet Soaps, Milled	June,	1936	27
Toilet Soaps, Penny Wise and Package Foolish	Apr.,	1939	26
Toilet Soaps, Preservation of	Sept.,	1937	57
Toilet Soaps, Specialties	Mar.,	1937	25
Toxicity of Pyrethrum Insect Sprays	Jan.,	1940	115
Toxicity of Tephrosia	Sept.,	1939	111
Trade Associations or Washington	July,	1936	114
Training Sanitary Supply Salesmen	Feb.,	1936	95
Transparent Soaps	Oct.,	1936	59
	July,	1940	65
Transparent Soaps, Milled	Jan.,	1936	69
Treating Dark Fats for Soap	Mar.,	1939	57
Triethanolamine Soaps	Aug.,	1937	61
Turkey Red Oil	June,	1940	61
Twitchell Glycerine	Sept.,	1938	59
Twitchell Process	Mar.,	1940	60

U

Unloading Liquid Caustic	May,	1939	31
Uses for Soap, New	June,	1939	24

V

Veterans' Insecticide Specifications	May,	1936	109
Vitamin Soaps	Nov.,	1936	30

W

Wall Paper Removers, Merchandising Plan for	Aug.,	1937	121
War Conditions, Soap Manufacture Under	Nov.,	1939	31
War and Soap Raw Material Costs	Oct.,	1939	28
Washroom Layouts	Feb.,	1940	26
Wash Test Methods	Apr.,	1939	31
Water and Soap Sales, Hard	Feb.,	1936	31
Water-Emulsion Floor Wax, Analysis	Dec.,	1940	119
Water Emulsion Waxes	May,	1936	97
	June,	1936	119
Water Softening	May,	1940	65
Wax, Carnauba	Aug.,	1939	111
	Nov.,	1939	105
Wax Polishes, Comments on Morpholine in	Aug.,	1938	99
Wax Polishes, Evaluation of	Oct.,	1938	86
	Nov.,	1938	95
Wax Polishes, Shellac in	May,	1940	94
Wax Saponification Value	Jan.,	1940	58
	Mar.,	1940	72
Wax Testing, Floor	Jan.,	1939	95
	Aug.,	1939	99
Waxes	Aug.,	1936	95
Waxes, Emulsion Floor	Dec.,	1936	121
	Jan.,	1940	111
Waxes, Floor What Do Specifications Mean?	Mar.,	1939	90
Waxes, Paste and Liquid	Mar.,	1937	99
Waxes, Synthetic	Sept.,	1936	105
	Oct.,	1936	105
Waxes, Synthetic, I. G.	Jan.,	1940	70
Waxes, Water Emulsion	May,	1936	97
	June,	1936	119
Wetting Agents and Detergency	May,	1937	63
Wetting Power	Sept.,	1939	30
Wetting Power, Determining	May,	1936	66
White Shoe Cleaners	Apr.,	1939	92
	May,	1939	107
	June,	1939	113
White Soaps	Dec.,	1940	25
Windshield and Glass Cleaners	Jan.,	1938	23
Wood Floors, Potash Soaps for	Oct.,	1938	31
Wool Fat, Wax from	Jan.,	1940	70
World Situation in Fats and Oils	June,	1939	27

Z

Zinc White in Soap	Apr.,	1940	69

INDEX TO ADVERTISERS

Allied Consolidated Industries..... 26
Alsop Engineering Corp.....Bet. 72 and 73
American-British Chemical Supplies..... 8
Ampion Corp. 100
Armour & Co..... 168
Aromatic Products, Inc..... 39
Associated Chemists, Inc..... 65

Baird & McGuire, Inc.....44, 190
Henry Barroll & Co..... 28
Breur Electric Mfg. Co..... 108
Brewer-Cantelmo Co. 34
Brill Equipment Corp..... 120

Candy & Co..... 58
Central Rubber Prods. Co..... 14
Ph. Chaleyer, Inc..... 140
Chicago Sanitary Prods. Co..... 95
Antoine Chiris Co..... 138
Clifton Chemical Co..... 62
Consolidated Products Co..... 120
Continental Can Co..... 18
Crown Can Co..... 20

Davies-Young Soap Co..... 172
Delta Chemical Co..... 43
Derris, Inc. 34, 92
Distributing and Trading Co..... 123
Dobbins Mfg. Co..... 110
Dodge & Olcott Co.....67, 136
Dow Chemical Co..... 80
E. I. DuPont de Nemours & Co..... 2

Eagle Soap Corp..... 174
Eastern Industries 29

Federal Varnish Co..... 54
Felton Chemical Co.....10, 82
Firmenich & Co..... 134
Florasynth Laboratories.....Bet. 124 and 125
Fuld Bros. 38

General Drug Co.....12, 142
R. Gesell, Inc..... 89
Givaudan-Delawanna, Inc. 68, 132

W. C. Hardesty Co..... 91
Hochstadter Laboratories..... 186
Hooker Electrochemical Co..... 79
Houchin Machinery Co..... 104
Thos. W. Houchin Corp..... 14
Hysan Prod. Co..... 56

Industrial Chemical Sales Division
W. Va. Pulp & Paper Co..... 112
Innis, Speiden & Co..... 122

Kay-Fries Chemicals, Inc..... 8
Spencer Kellogg & Sons, Inc..... 30
Koppers Co. 76

Lamepon Products 41
Lancaster, Allwine & Rommell..... 186
Alan Porter Lee..... 49
J. M. Lehmann Co..... 101

Mac-Lac Co. 97
N. I. Malmstrom & Co..... 70
The Mantrose Corp..... 96
McCormick & Co..... 6
Mixing Equipment Co..... 74

National Can Co..... 16
Niagara Alkali Co..... 86

Onalim Co. 94
Orbis Products Corp..... 4

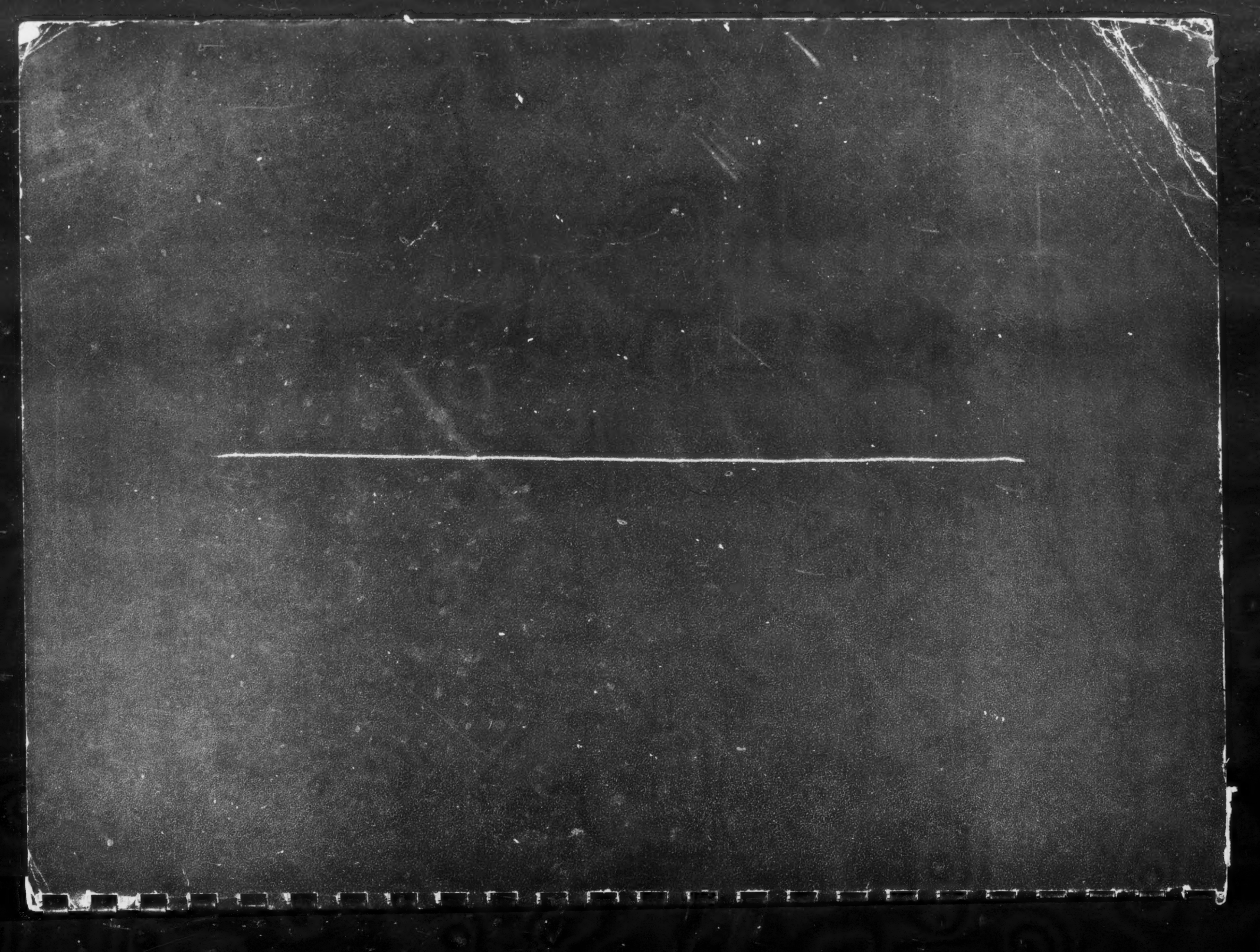
Palmer Products, Inc..... 102
S. B. Penick & Co..... 66
Petroleum Specialties, Inc..... 48
Philadelphia Quartz Co..... 106
Pittsburgh Coal Carbonization Co..... 114
Pittsburgh Plate Glass Co., Columbia Chem. Div... 22
John Powell & Co.....88, 98
Proctor & Schwartz, Inc..... 24
Pylam Products Co..... 32

Reilly Tar & Chemical Co..... 192
Rohm & Haas Co..... 64
H. H. Rosenthal Co..... 37

C. G. Sargent's Sons Corp..... 46
Sennewald Drug Co..... 84
Skinner & Sherman..... 186
Foster D. Snell..... 186
Solvay Sales Corp.....176, 177
L. Sonneborn Sons..... 83
Sparkler Mfg. Co..... 53
Standard Synthetics, Inc..... 48
John T. Stanley Co..... 126
A. E. Starkie..... 90
Stevens Soap Corp..... 170
Stokes & Smith Co..... 52
Superior Soap Corp..... 42

Tombarel Products Corp..... 81

Uncle Sam Chemical Co..... 40

Albert Verley, Inc..... 144
Victor Chemical Works..... 116

Warner Chemical Co..... 118
T. F. Washburn Co..... 158
Wecoline Products Inc..... 50
Welch, Holme & Clark Co..... 36
Woburn Degreasing Co. of N. J..... 50
White Tar Co. of N. J..... 76
Wurster & Sanger, Inc..... 60